MAUU5900

MASTER THESIS

in

Universal Design of ICT

May 2019

Intersectional Accessibility

Rannveig A. Skjerve

Department of Computer Science

Faculty of Technology, Art and Design

OSLOMET

Preface

As the prevalence of technology around the world increases, we as developers and designers can either choose to be unconscious accomplices, or conscious opposers to the reproduction of oppression that happens in our code and design. This thesis is a proposal that we can, and should, be the latter.

I am extremely lucky to have a support system that has encouraged me, supported me, and picked me up from whatever floor I've been lying on throughout this process, and I am grateful beyond what I can express. No one forgotten, but still there are some that I want to thank specifically. The participants that were willing to dedicate their valuable time to this research. My twin sister, Torgunn, for being the steadiest rock and best proof-reader. Tiffany for having enough confidence in me for the both of us. My parents, Torbjørn and Vigdis, for challenging discussions and their kindness. And Anthony; thank you for getting me into this mess. And for getting me out of it. It has been horrible/amazing.

Abstract

Intergovernmental organizations recognize that people with (dis)abilities experience discrimination in intersections between oppressive system. For example, the European Union has adopted the term "multiple discrimination" to describe discrimination on several grounds(Schiek & Lawson, 2011) In the recent years, researchers within Universal Design of ICT has started to apply intersectional-type methods to investigate the implications of these intersections in accessibility (Giannoumis & Skjerve, 2020; Giannoumis & Stein, 2019; Skjerve, Giannoumis, & Naseem, 2016) This thesis presents result from a study consisting of interviews with persons that holds intersectional identities. The findings show that persons with intersectional barriers experience unique barriers in relation to cost and affordability, exclusion and online aggression and learnability. It uses a Constructivist Grounded Theory approach to propose a model depicting intersectional barriers as a combination of instances and processes. The findings in this thesis can give direction to future research and inform development- and policy making processes through identifying points of interest where persons with intersectional identities experiences barriers.

Contents

Tables

Figures

1   Introduction

This report presents findings from a qualitative study aimed at expanding knowledge within intersectional accessibility. It employs an intersectional-type method to explore access and use of technology among persons with intersectional identities.

Intersectionality is a method and a theory that acknowledges that oppressive systems intersect and creates new forms of discrimination for persons holding several oppressed identities. It focuses on the interactions between oppressive systems and how they manifest in a person's life (Crenshaw, 1991). Intergovernmental organizations recognize that people with (dis)abilities experience discrimination in intersections between oppressive system For example, the European Union has adopted the term "multiple discrimination" to describe discrimination on several grounds(Schiek & Lawson, 2011). Likewise, the United Nations Convention on the Rights of People with Disabilities highlights equality between men and women as one of its general principles (UN, 2006a)

Scholars in fields such as Science and Technology studies and Critical Disability Studies have explored identity and oppression within technology, finding that it impacts both access to, and use of technology. Likewise, articles in universal design of architecture has argued for including intersectionality as a part of universal design scholarship, addressing that the current approach to universal design favors accessibility for rich white (cis)men[1] (Hamraie, 2013a, 2015a, 2016)

With an increasingly diverse aging population(UN Department of Economics and Social Affairs, 2017) and the increasing global prevalence of technology, the consciousness about our own contribution to these inequalities as developers, researchers and designers becomes more and more important. Recently, research that investigate if, how and when barriers are created in the intersection between oppressed identities in universal design of ICT has emerged. (Giannoumis & Skjerve, 2020; Giannoumis & Stein, 2019; Skjerve Giannoumis, & Naseem, 2016) While the research points to the potential of applying an intersectional-type framework to universal design, very little is known about what this would look like.

This thesis aims to expand this knowledge with an analysis of qualitative data from interviews with 11 participants. It asks the question "How does intersectional oppression affect the use of ICT and create new barriers?" and attempts to answer this question through an exploration of experiences, and theorization using Constructivist Grounded Theory.

---

[1] Cis-gendered refers to persons whose gender identity coincides with the gender they were assigned at birth. A cis-man is a person that identifies as a man and was assigned male at birth.(Merriam-Webster, n.d.)

2   Background

2.1   (Dis)ability

The United Nations Convention on the Rights of Persons with Disabilities (CRPD) states that (dis)ability is "an evolving concept" that "results from the interaction between persons with impairments and attitudinal and environmental barriers that hinders their full and effective participation in society on an equal basis with others" (UN, 2006a). Universal design practices are inherently linked with our own presumptions and conception. Consequently, an exploration of universal design practices needs to include an exploration of our own conception of (dis)[2]ability.

This section offers a brief description of the shift from the medical model approach, to a more complex understanding of (dis)ability before it goes on to discuss newer concepts proposed by Critical Disability scholars.

2.1.1   Models of (dis)ability

In the last 50 years the concept and understanding of (dis)ability has shifted, from a *defect* in a person's body to a result of complex interactions between a person's impairment(s) and attitudinal and environmental barriers created by society (Johnstone, 2005).

Two points should be addresses before proceeding with this discussion. Firstly, although the shift is seen as progress, the development of mainstream theories and models have been criticized for its whiteness[3] and emphasis on disability in the cultural context of the Global North (Hamraie, 2015a; Meekosha, 2011). Secondly, the models of disability are not conforming or static entities. The content of the models both evolve, intertwine, and are contested in-between proponents, as well as by opponents. An example of this is the place of the individual in the social model. While some claim that there is no induvial in the social model (Hughes & Paterson, 1997), others claim that it is a vital component (Oliver, 2013).

The medical model

The medical model is often described as an individual tragedy approach due to its placement of (dis)ability as the responsibility of the individual(Johnstone, 2005). In the medical model, (dis)ability is understood as a *deviance* or *malfunction* in a person's body; the goal is to correct/eradicate the (dis)ability through medical interventions(Berghs, Atkin, Graham, Hatton, & Thomas, 2016).

While some scholars claim that the aversion towards the medical model is counterproductive (Grue, 2010), the medical model in its strictest form is considered both outdated and ableist by (dis)ability activist and scholars (Berghs et al., 2016; Loja, Costa,

---

[2] The norm-critical annotation (dis)ability is the preferred way of writing throughout this thesis, disability is used however where it is appropriate in terms of terminology or conveys a specific meaning .

[3] Whiteness in this context describes both the overrepresentation in the development of the theories, and emphasis on experience, of people that does not experience racialization.

Hughes, & Menezes, 2013)

The social model

The social model developed as a reaction to the medical model within the disability rights movement in the United Kingdom in the 1970's. The social model distinguishes between *impairment* and *disability*. An *impairment* is a function variation in the body, disability is what happens when a person with an impairment meets environmental and attitudinal barriers created by society (Berghs et al., 2016). This conceptualizes (dis)ability as a form of social oppression created by (dis)ableism, barriers and exclusion, and places the responsibility on the society rather than the induvial (Oliver & Barnes, 2012).

Critics of this model has addressed the separation of impairment and disability, claiming that it is an overly simplistic dichotomy that leaves the impaired body as an entity of little or no concern. This, critics say, ignores the effect of the actual impairment in a person's life. For example, a person whose impairment cause chronic pain, will always live with that pain regardless of societal norms and attitude. Furthermore, when the body is of no concern, any other particularity of the body becomes of no concern, which lends itself to a neglect of diversity within the group of people with (dis)ability (Berghs et al., 2016; Hughes & Paterson, 1997; Oliver, 2013, p. 20; Shakespeare & Watson, 2002)

The rehabilitation model

While the rehabilitation model sometimes is seen as a newer iteration of the medical model (Berghs et al., 2016), it is described here as a separate model. This choice has been made firstly, to distinguish it from what has come to be considered an outdated model. Secondly, because of its resemblance to the relational gap-model[4] prevalent in the Nordic countries (Lid, 2013) and therefore it is highly relevant to the context this report is written in. Thirdly, because of its relation to the model adopted in the International Classification of Functioning Disability and Health adopted by the World Health Organization (World Health Organization, 2011) in high use in statistics about (dis)ability.

The rehabilitation model developed as a response to the increasing critique of the medical model and the influence of the social model (Berghs et al., 2016). Its emphasis lies on *restoration*; the individuals return to society through a mutual adjustment between the individual and society (Johnstone, 2005).

The critique of the rehabilitation model has focused on two issues. Firstly, as with the medical model, its partial focus on the altering of function places responsibility of the (dis)ability on the individual. Secondly, as with the social model, the difference between individuals are diminished. These two issues adds up to a form of *normalization* approach that inadvertently communicates a devaluation of persons with (dis)abilities (Berghs et al.,

---

[4] The gap-model defines (dis)ability as a gap between a person's function and the society's accommodation. The efforts in this model centers around *strengthening* the individual *capabilities* and altering society's accommodation in order to close this gap (Eika, 2011a)

2016).

As a response, rehabilitation scholars have begun to explore more complex understandings of (dis)ability and impairments. In this type of approaches, (dis)ability is understood as an *interaction* between not only the individual, but as a complex relationship between the individual, material, temporal and social aspects (Winance, 2014).

The human rights model

The human rights model frames (dis)ability specifically as an issue of equality. It focuses on the value and agency of people with (dis)ability, reflected in the slogan "nothing about us without us" widely adopted by the disability movement. The *rights* to self-determination and participation as opposed to *needs* of persons with (dis)ability is central in the human rights model. (Dis)ability in this model is inequality created by structural oppression and consequently the obligation of the society. (Berghs et al., 2016)

The Critical Disability model

The Critical Disability model questions the dichotomy between *impairment* and *disability*, while at the same time rejecting the pathologizing tendencies in the medical model (Berghs et al., 2016). The Critical Disability model criticizes *the value* put upon (dis)ability by an ableist society. The social transformative perspective in this model centers around deconstruction of the norms of the *human being*.

The theoretical underpinnings of this model are discussed in section 2.1.2 Critical Disability Studies

2.1.2   Critical Disability Studies

Critical Disability Studies (CDS) is a norm-critical approach to (dis)ability. Scholars within the field questions the dichotomy between impairment and disability because of the implied hierarchy of ways of functioning (Meekosha & Shuttleworth, 2009). In such a hierarchy, a person using a screen reader performing a task will always fall short compared to a person not using screen reader, even when the person that uses the screen reader achieves the task faster than the other person. In other words, if an impairment is a functional flaw in the body, then there exists a functional right that always places one way of functioning above the other.

(Dis)ability has no clear definition in CDS but is explored through processes and encounters between the body, the environment and knowledge. The body and the society are interlinked in (dis)ability, rather than separate entities that collide (Connell, 2011).

Ableism

Ableism in the CDS context is a range of believes, processes and practices that places the (dis)abled body as deviant, undesired or unfortunate. It is a system of oppression that portrays (dis)ability as a *deviation* from the norm of the *correct* or *functional* body. These thoughts and practices leads to discrimination and devaluation of people with (dis)abilities (Loja et al., 2013).

Disabled embodiment

"... [disabled people] are familiar with what it feels like to live as a disabled person..." (Shakespeare, 2016).

This quote describes the essential mechanism of (dis)abled embodiment. (Dis)abled embodiment is the experience, identity and knowledge informed by particularities of the body and the environment (Wilkerson, 2015). In other words, an embodiment is a person's experience of (dis)ability in its widest sense. It is the *construction* of identity and performance through bodily experiences, social and interbodily encounters.

Dependency

Feminist and Critical Disability Scholars has questioned the conceptualization of dependence as a failure. These scholars propose that the independent individual is a myth, founded in a liberal tradition that negates the vulnerability inherent to the human body and mind. Dependency exists amongst all humans in family ties and friendships, and as a source of joy in giving and receiving care. While this definition values dependency, it is not a rejection of independence, but a recognition of the dependency in independence (Garland-Thomson, 2011)

Crip theory

Crip theory extends CDS' conceptualization of (dis)ability through the concept of "compulsory able-bodiedness" which depicts the creation of (dis)ability identity through a society that centers able-bodiedness as the *normal* and the *ultimate goal* (McRuer, 2016). In this thesis, (dis)ability as it is understood in Crip theory, forms the basis for a further enquiry into the complexity in the meeting between norms, ICT and power.

2.2   Intersectionality

> "There is no thing as a single-issue struggle because we do not live single-issue lives."
> — *Audre Lorde*

Recognizing (dis)ability as a continually evolving concept shaped by the larger context of a person's life also means recognizing that a person's context is not merely connected to (dis)ability. Consequently, working with accessibility must involve exploring the effect different contexts have on accessibility. This section discusses intersectionality as an approach towards the globalization of technology and (dis)ability discourse.

Intersectionality is both a theory and a methodology that recognizes that systems of oppression intersect with each other, complicating identities beyond simplified, separate components, like ethnicity, race, class, sexuality, age, (dis)ability, citizenship status and gender (Collins & Bilge, 2016). From this perspective, identity cannot be isolated or split into separate parts. For example, a Black (disabled woman cannot isolate the Black or the woman from her (dis)ability identity, they are one and the same. This means that she never engages with technology as (dis)abled alone, but as a (dis)abled, Black woman. Research shows that women of color experience extensive online harassment. The harassment is distinctly

different than white women in that it combines sexism with racial stereotypes like "the angry Black woman" or "eroticized and obedient Asian woman" (Felmlee, Rodis, & Francisco, 2018).

Intersectionality does not propose that all individuals with the same identities are alike. Rather it seeks to describe how the context of a person is shaped by oppressive structures, and to identify how this manifest among persons with the same identities. For example, not all women with other oppressed identities have experienced gendered violence, but the likelihood of this experience is higher than for otherwise privileged women because oppressive structures are in place that facilitate and legitimize the violence further(Crenshaw, 1991; Meer & Combrinck, 2015).

2.2.1   Transnational feminism

Transnational feminism is an approach that challenges boundaries between nation-states and social cultures, situating feminist discussions in an international context. For example, satellite and internet technologies have allowed greater volumes of media, especially visually based imagery, to be promulgated around the world (Fernandes, 2013) . This can destabilize structures of power that systematically oppress people but can also reinforce stereotypical images as with the case of inspiration porn.

The term inspiration porn refers to a specific type of disability memes. Inspiration porn displays a (young, white) person with a visible impairment performing some kind of activity accompanied by an "inspiring" caption like "what's your excuse?" (Grue, 2016). The inspiration porn meme reinforces the stereotypical image of (dis)ability as a personal tragedy that can be overcome if you are willing to make the effort. In addition, the overwhelming prevalence of young, white persons with access to expensive assistive technology negates a person's wider context such as class, race and gender(Hadley, 2016). Likewise, women of color engaging in conversations experience hate speech online based on stereotypes. When these conversations reach a wider audience, the stereotypes are reproduced and spread more widely among the persons reading them (Felmlee et al., 2018).

2.2.2   (Dis)ability and intersectionality

Gender identity, race, sexual orientation, cultural context etc. interacts and affects the experience of a person living with (dis)ability, often compounding disadvantages because of intersecting hierarchies and structures of power (Chaudhry, 2016; Moodley & Graham, 2015a).

Harassment and violence against persons with (dis)abilities are often grounded in an intertwined deviance from norms. For example, women with intellectual (dis)abilities experience more gender-based violence than other women (Meer & Combrinck, 2015). The notion that (dis)ability exists alone and independently, has been shown to affect the access and quality of education (Nguyen & Mitchell, 2014). Likewise, a failure to consider persons with (dis)abilities in efforts to better health and economic conditions limits, or excludes altogether, persons with (dis)abilities from participation, as in the case of microfinance loans

in India meant to economically empower women (Chaudhry, 2016). Persons with intersectional identities also experience compound forms of discrimination which severely affects a person's health. A study of mental health care in South Africa found that Black African women with (dis)abilities was more vulnerable to depressions than other persons with (dis)ability (Moodley, 2019).

This thesis employs an intersectional-type framework to (dis)ability and technology. It conceptualizes barriers as both products and producers of oppression, and accessibility as a matter of identity rather than technical requirements for variations in the body.

2.3   Universal Design

Accessibility in an ICT context is a term that describe the qualities which accommodates access and use of assistive technology for persons with (dis)ability (Eika, 2011b). This is usually achieved by adherence to guidelines and recommendations provided by expert organizations such as W3C' s Web Accessibility Initiative or governmental organizations[5].

Universal Design is defined as "The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design" (Mace et al., 1997). This definition differs from earlier approaches of accessible design in that it seeks to design services and products that does not communicate disabling values and attitudes, as well as removing barriers (Imrie, 2012).

An illustration of this are the 7 principles of Universal Design defined in 1997:

> Equitable use

1. Flexibility in use
2. Simple and intuitive use
3. Perceptible information
4. Tolerance for error
5. Low physical effort
6. Size and space for approach and use

These principles go beyond accessibility in their description because they call for products and services that are *designed* for diversity rather than accommodating it (Connell, 2011; Eika, 2011c)

2.3.1   The troublesome *all*

While the universal design definition seems to establish a clear set of values, it has been criticized for having an underexplored philosophical and theoretical basis (Gibson, 2014; Hamraie, 2013; Imrie, 2012; Winance, 2014). This section discusses this criticism, focusing on the process of transferring the universal *all* from an abstract to a concrete realm.

▌ The reductionist all

Finding a balance between diversity and uniformity, standards and exceptions, is a challenge

---

[5] Such as the French RGGA and U.S.A's Section 508

for anyone working on accessibility (Adam & Kreps, 2009; Persson, Åhman, Yngling, & Gulliksen, 2015). In this balance, universal design has been criticized for putting too much weight on the function aspect of (dis)ability. This approach ignores the temporal and spatial aspects that is not directly associated with the object itself , creating the illusion of a "general disabled body" where diversity of self-perception and practical arrangements and is minimized or removed all together (Frauenberger, 2015; Peine, Faulkner, Jæger, & Moors, 2015; Winance, 2014). The *reductionist all* presumes that a person with a hearing-aid in a small group of people will have the same experience in a large group of people, not considering the difference in experience of the hearing aids function or how the person choses to deal with that difference.

The anonymous all

The *anonymous all* is similar, but not the same, as the *reductionist all*. They originate in the same issue, the focus on function in universal design. While the *reductionist all* depicts the reduction of complexity in (dis)ability, the *anonymous all* depicts the removal of identities and the power and privilege associated with these (Fuchs & Obrist, 2010; Hamraie, 2013b). The *anonymous all* presumes that the experience of a person in a wheelchair with a high income is the same as a person in a wheelchair with a low income, not considering the difference in what quality of equipment a person can afford

The political all

The *political all* in universal design is an incohesive construct. In the definition, the *what* of universal design, its appearance is norm-critical aligned with (dis)ability activists and scholars. It emphasizes discrimination both through attitude and infrastructure, and communicates a value set where persons with (dis)abilities is a *part of all*, not a group which needs to be included in *the all.* In contrast, the *why* in universal design often centers around economical gains and inclusion (Norwegian Directorate for Children, Youth and Family Affairs, The Delta Centre, 2013). This interpretation of the *all* encourages development of the most profitable product where minority groups that constitutes smaller markets and people with low income is left out from the consideration. *The economical all* at best favors people with more economical resources, at worst it excludes people with less (Hamraie, 2015; Olson, O'Brien, Rogers, & Charness, 2011). The *included all* appears as an opposite to the norm-critical, a pre-existing center of *being* where *others* must assimilate or be assimilated to take part. In the included all, (dis)ability is a factor to be adjusted to society but never as a part of society (Graham & Slee, 2008).

2.3.2   Intersectionality and Universal Design of ICT

Scholars and professionals within universal design recognizes that context and diversity within user groups should inform design)(Dix, Finlay, Abowd, & Beale, 2004; Kelly et al., 2009). As Fuglerud (2009) states; "…if you do not know what users think and do, you do not know what they need".

While user testing and studies has shown to increase awareness and inform design, these techniques can be costly and time consuming. Personas, fictional users based on previous

studies and knowledge, has been proposed as a more efficient alternative (Fuglerud, 2009; Marshall et al., 2015; Miaskiewicz & Kozar, 2011). While personas show promise, and indeed is used in many fields, it has been criticked for the possibility of stereotyping social groups (Marsden & Haag, 2016; Turner & Turner, 2011).

Intersectional-type approaches have, until recently, been unused concepts in universal design of ICT ((Skjerve et al., 2016). This type of approach has been proposed as a new avenue of uncovering barriers, extending the universality of universal design, and aligning the universal design movement with the human-rights activist . (Giannoumis & Skjerve, 2020; Giannoumis & Stein, 2019; Skjerve et al., 2016)

While policy about ICT accessibility is widely adopted, both by transnational organizations and in many countries (UN, 2006b; W3C WAI, 2019). While these laws address the need for accessibility for persons with (dis)ability, they have yet to consider the effect of intersectional discrimination.

The research in this thesis is based on this idea. It applies an intersectional-type framework to reclaim the *all* of universal design as a *political all* with an anchoring in norm-critical thinking and human rights activism.

Early conceptualizations of technology considered it value-neutral practice. This has been rejected by scholars within various branches of Science and Science and Technology studies, pointing out that design and development is performed by humans in a society with a value set that is inextricably linked to each other(Ford & Wajcman, 2017; Gauthier & Sawchuk, 2017). This implicates that the hegemony and prevalence of (relatively) young, white, able-bodied, cis-men from the global north in the field of ICT, inherently must lead to systems that in structure and design favors this group. (Parvin, 2019; Banner, 2019; Costanza-Chock, 2018a; Costanza-Chock, 2018b; Umbrello, 2018; McIlwain, 2017; Ford & Wajcman 2017; Hankerson et al., 2016; Winschiers-Theophilus & Bidwell, 2013, Faulkner, 2001; Friedman & Nissenbaum, 1996). A comprehensive discussion of this research is beyond the scope of this thesis, but for clarity a three-level description is provided below. Starting at the very heart of computing; the algorithm, progressing to knowledge in existing systems and ending with the reproduction of power structures in Human-Computer Interaction(HCI).

2.4   Oppression in technology

Early conceptualizations of technology considered it value-neutral practice. This has been rejected by scholars within various branches of Science and Science and Technology studies, pointing out that design and development is performed by humans in a society with a value set that is inextricably linked to each other (Ford & Wajcman, 2017; Gauthier & Sawchuk, 2017). This implicates that the hegemony and prevalence of (relatively) young, white, able-bodied, cis-men from the global north in the field of ICT, inherently must lead to systems that in structure and design favors this group (Banner, 2019; Costanza-Chock, 2018b, 2018a; Ford & Wajcman, 2017; Friedman & Nissenbaum, 1996; McIlwain, 2017; Parvin, 2019; Umbrello, 2018; Winschiers-Theophilus & Bidwell, 2013). A comprehensive discussion of this

research is beyond the scope of this thesis, but for clarity, a three-level description is provided below. Starting at the very heart of computing; the algorithm, progressing to knowledge in existing systems and ending with the reproduction of power structures in Human-Computer Interaction(HCI).

2.4.1 Algorithmic unfairness

An algorithm in itself is a procedure that performs a finite set of operations on some input to produce some output. If the same set of procedures is performed regardless of input, the output should be objective. Research has refuted this, addressing that algorithms can systematically discriminate against persons or groups depending on the design of the algorithm (Friedman & Nissenbaum, 1996) While the algorithm is performed without any outside influence, what input it should be given, how it is handled and what this should result in is defined by outside interests and biases. This issue is amplified with the emergence of machine learning and the reproduction of human bias this entails (Banner, 2019; Barocas & Selbst, 2016; Introna & Nissenbaum, 2000).

Algorithms in search engines has been shown to perpetuate stereotypes and provide biased suggestions with less relevance for oppressed groups. For example, when the first 20 hits of an image search for "success" contains no images of women and people of color, or the autocomplete suggests "get AIDS" as a completion of "why do gay men" (Baker & Potts, 2013; Brock, 2011; Karapapa & Borghi, 2015; Miller & Record, 2017)

Algorithm unfairness can also have a profound impact on a person's economy. The data that is collected about a person online is used by governments, employers and finance companies to make decisions such as employability, credit score, risk assessment for insurance, and access to healthcare (Altman, Wood, & Vayena, 2018; Lecher, 2018)

2.4.2 Exclusion by infrastructure, the example of Wikipedia

Researchers have shown that the infrastructure and culture on Wikipedia favors white men. While the well documented lack of minority representation has been prescribed to less knowledge or fear of conflict, these researchers address that the system creates inequalities between the know-hows and know-nots(J. Adams, Brückner, & Naslund, 2019; Ford & Wajcman, 2017; Gauthier & Sawchuk, 2017; Shaw & Hargittai, 2018) (Adams et al., 2019; Shaw & Hargittai, 2018; Ford & Wajcman, 2017; Gauthier & Sawchuk, 2017). Firstly, contributing on Wikipedia requires that you have some experience with coding, since the editing system requires you to do so. Likewise, in the case of someone disputing the facts of your article, a web of code is applied, which means that you cannot effectively defend your article without being in the know (Ford & Wajcman, 2017). Second, the epistemology of Wikipedia, Neutral Point of View (NPOV), is enforced through discussions where persons from minorities are outnumbered and "outshouted" by the majority(Gauthier & Sawchuk, 2017; Shaw & Hargittai, 2018). In other words, Wikipedia enforces a value-laden process of knowledge creation through infrastructure and culture, although its guidelines and

appearance might be read as neutral.

2.4.3 Power reproduction in HCI

Critical scholars within HCI has addressed the need for researchers and designers to reflect on the social implications of their work. The criticism is based around how HCI practices reproduces power relations through an assumption that models and techniques are directly transferable within the range of human diversity. Likewise, mainstream HCI are critiqued for a relationship to the global south as knowledge consumers rather than knowledge creators, and a disregard of indigenous (Bidwell, 2016; Keyes, Hoy, & Drouhard, 2019; Rogers, 2012; Winschiers-Theophilus & Bidwell, 2013). A comprehensive discussion about these critiques is beyond the scope of this thesis, but an example is included below for clarity.

The Participatory Design method, which emphasizes the involvement of the user in the design process , is considered a democratic and value producing method within mainstream HCI (Trischler, Pervan, Kelly, & Scott, 2018). However, because of the methods origin in Scandinavia, the involvement mechanisms draws heavily on the social democratic model with strong labor unions. This poses an issue when the method is used elsewhere in context where non-organized workforces are the norm, and where agency is performed in a different way than in the social democratic model (Irani, Vertesi, Dourish, Philip, & Grinter, 2010). Furthermore, its lack of consideration for power relations might lead to a hidden top-down approach where the designer as the "expert" disregards input from users. For example, a designer might disregard input from children or elderly because they are seen as less knowledgeable(Iivari, Kinnula, & Kuure, 2015; Orzeszek et al., 2017). Interests of women might be perceived as inconsequential or provoking, as in the case of gaming design where critique of sexualized women characters is perceived as "wining" (Bardzell, 2010; Kafai, Richard, & Tynes, 2017; Markussen, 1996). Likewise, disregard for indigenous knowledge and expertise excludes indigenous knowledge holders' perspectives, even though their insight in their communities are highly relevant for the design (Sultana & Ahmed, 2019).

████ Usability

According to the International Organization for Standardization ([ISO] , usability is "extent to which a system, product or service can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use". In other words, usability is the qualities in a system which creates a good experience for a user in a certain context. It is beyond the scope of this study to describe the various aspects and approaches in usability. This section therefore, provides an overview of research on usability for persons with persons that holds oppressed identities.

A study conducted 2016, showed that age, gender[6] and educational background had no significant effect on what kind of usability problems persons with high ICT skills experience (Billestrup, Bruun, & Stage, 2016). However, the participants were either employed or

---

[6] Genders represented were man and woman

studied at the same university. Research with less homogenous groups has shown that criteria for usability differs between genders for websites. Women interacted with the web more cautiously than men, which resulted in a preference towards interfaces that provided the most assurance, for example through more instructions (Huang & Yuan, 2017; Lin & Hsieh, 2016; Oyibo & Vassileva, 2017). Likewise, lack of confidence and frustration has been shown to be significant features in interactions between technology and oppressed groups (Sarkar et al., 2016).Research on age and usability shows that elderly persons experience more usability issues. While some of this has been prescribed to less skills and change in cognition among elderly users, the way one measures usability has been questioned by scholars, addressing that measures such as efficiency might be inaccurate when dealing with elderly persons(Chadwick-Dias, McNulty, & Tullis, 2003; Sonderegger, Schmutz, & Sauer, 2016; Wagner, Hassanein, & Head, 2014) (Sonderegger et al., 2016; Wagner et al., 2014; Chadwick-Dias et al., 2003).

Previous research has shown that oppression in technology manifests in the way we design and program. In this thesis, this oppression is conceptualized as barriers in an intersectional-type analysis of universal design.

3 Methods

This thesis employs a multimethod qualitative approach through semi-structured interviews. An intersectional-type framework has until recently not been explored as a framework for universal design of ICT, and we still know very little about intersectional experiences with ICT for persons with (dis)abilities (Giannoumis & Skjerve, forthcoming ; Giannoumis & Stein, forthcoming; Skjerve, et al., 2016). Qualitative methods is particularly useful in such circumstances because it allows for exploration and discovery rather than the measuring and quantification of known theories in quantitative methods (Denzin & Lincoln, 2011a). Likewise, a looser structure of interviews creates more space for the participants to express themselves and share their experiences, which allows for deeper insight than strictly structured interviews (Lazar, Feng, & Hochheiser, 2010a).

3.1 Interviews

Eleven interview participants were purposively selected based on holding intersectional identities. The participants held one or more of the following identities; person of color, woman, person with (dis)ability, experience with transnational immigration and low-socioeconomic background. Countries of origin were Norway, India, Mongolia, Poland, Russia, United Kingdom and United States. All participant where persons with (dis)abilities except one, which was included to further expand on the experiences of persons with intersectional identities

Persons of color	7		
Women	8		
Experience of transnational immigration	6		
Low socio-economic background	4		
Persons with (dis)abilities	Physical	4	
	Sensory	5	
	Psychosocial	1	

Table 3-1 Participant identities

Norway	4
India	1
Mongolia	1
Poland	1
Russia	1
United Kingdom	1

Table 3-2 Participants by country of origin

The interviews were conducted face-to-face, or online video chat. An interview guide consisting of 19 questions formed the basis for interviews. The questions were focused around three themes; general experiences in access and use of ICT, barriers experienced using ICT, and experiences with oppressive content on the web. Additionally, the participants were encouraged to speak freely about any experience or topic they thought of as relevant to the study.

The interviews were conducted in English and Norwegian. Transcripts of the interviews were produced and anonymized. Countries, organizations and specific identities were only included in the transcripts if they provide necessary context, and if the information did not jeopardize the anonymity of the participants.

3.2   Analysis

The analysis was performed using a multimethod strategy. First, a descriptive qualitative analysis was performed, focusing on intersectional experiences. Second, the data was coded using a Constructivist Grounded Theory approach. Combining methods in the research design. The choice of a multimethod strategy was based on a need for knowledge within the field both in terms of experiences, implications, and possibilities for framework development. All research methods has its strengths and weaknesses. Combining methods therefore, allows for a more complete view of the human experience (Johnson & Walsh, 2019).

3.2.1   Constructivist Grounded Theory

Grounded Theory (GT) refers both to a method of inquiry and its product(Anthony Bryant & Charmaz, 2011). It originated in palliative research with the publication of "The Awareness of Dying" by Barney G. Glaser and Anselm L. Strauss in 1965 and was further elaborated in "The Discovery of Grounded Theory" by the same authors two years later. In these two publication, Glaser and Strauss criticized how methods only were used to confirm existing theories/models rather than letting the theory/model "emerge" from the data itself (Bryant & Charmaz, 2011) . In other words; the theory should evolve together with the data, not before and after. In their early works Glaser and Strauss advocated that researchers should approach the research with a blank slate, even going as far as having no knowledge of

previous research to avoid forcing data into predefined notions (Glaser & Strauss, 1967) . This position is still held by Glaser, while Strauss later diverged from this notion, arguing that theoretical pre-knowledge is always present in the analysis of data (Corbin & Strauss, 1990) .

While Glaser and Strauss' Grounded Theories adopts a positivist epistemology, that "true" knowledge is based on natural phenomena, later GT scholars has argued for a constructivist approach. Constructivist Grounded Theorists (ConGT) emphasizes the truth as a temporal and contextual phenomenon (Charmaz, 2006a) . For example, the statement "I do not know any lesbians" can be a person's truth, even if they have a sister that is lesbian, but have chosen to not disclose it to her family. This depends on a temporal element of the truth; if the sister later choses to "come out", it will no longer be the person's truth because their knowledge has changed.

ConGT is chosen over traditional GT in this thesis. Firstly, because it offers a systematic approach to theory building that integrates subjective experience in a societal structural context (Charmaz, 2005) . Secondly, a person might experience barriers and oppression differently depending on the spatial and temporal context. For example, offensive language in an online commentary section is by many considered as inconsequential. The same language in an online newspaper article however, has been described by some to cause serious distress (Skjerve et al., 2016).

Coding

At the initial coding stage, simple names are given to passages of the text that describes the content. The naming should stay close to the data, taking the cue from the language in the data itself rather than from "outside" influences (Charmaz, 2006b). As an example, consider this text; "I often feel like I'll regret it forever when my friends are planning to attend something and I'm unable to join". This description resembles the popular expression FOMO; Fear of Missing Out, it does however not fit with the way it is expressed. A more accurate coding could therefore be "Expects to regret not joining". This also addresses an important aspect of Grounded Theory Methods; to let the data speak without "forcing" preconceived knowledge upon it (Bryant & Charmaz, 2011).

When the initial coding is performed, codes are sorted and analyzed to identify the most significant codes, and relationships between them. This stage is known as the focused coding stage, and prepares the data for theoretical coding (Charmaz, 2006b).

In the third stage the focused codes are examined and synthesized into categories that will form the Grounded Theory, the outcome of the research process. In this stage, the researcher may choose to move the naming away from the language in the original text, but not so far that it "overwrites" the data with preconceived knowledge (Holton, 2011).

Memo writing

Memo writing is an integral part of the GTM (Lempert, 2011). Memo writing is performed throughout the research process, before, under and after interviews. The memo acts as the researcher's "inner dialogue", describing the researchers thought process as they interact

with the data (Bryant & Charmaz, 2011) . The memos allow the researcher to compare old and new findings, checking and correction the progression of the theory to ensure that it stays grounded throughout the research process (Lempert, 2011).

4　Ethical concerns

Qualitative research poses several ethical concerns for researchers (Berger, 2015). These concerns can roughly be divided into two groups; the ones concerning confidentiality and the ones concerning the position of the researcher. This section discusses these issues and the measures that was taken to ensure an ethical research process.

4.1　Confidentiality

Confidentiality, that shared data from a participant cannot be traced back to the induvial, is essential in the quantitative research process. Firstly, participants may choose to share experiences and feelings that they would be uncomfortable with sharing in public. Secondly, and specifically to the research in this project, participants may choose to disclose identities that they have chosen to keep secret in certain contexts such as work and family (Denzin & Lincoln, 2011).

4.1.1　Deductive disclosure

Deductive disclosure occurs when a set of information given in the research makes the data traceable back to a participant. For example, if the research is conducted in a small community, a description of a specific situation might be recognizable for several people within this community. If the description further entails characteristics of the participants, for example, "woman in her 20's", the identity of the informant is easily detectable, even though name and appearance is not mentioned (Kaiser, 2009). The risk of creating deductive disclosure is high in this project due to the sample size and recruitment strategies within networks and social media. Identity markers such as "(dis)abled", "person of color" and "transgendered" can easily be combined within small communities to identify a person. Likewise, identity markers combined with description of behavior on specific social media can be revealing. It is therefore important to consider what quotes to include, and if identity markers or specific settings should be disclosed. For example, consider a fictional quote from a person that identify as (dis)abled, genderqueer and person of color; "The other day I got into this huge argument on twitter about the Little Black Dress". A google search combining the identity markers, topic and specific platform would most likely reveal the identity of the participants. In this case, replacing "twitter" with "[social media platform]" could be an alternative to protect the participant.

4.1.2　Anonymization strategy

In this project, the identifiable data can be split into two categories; direct linking identifiers such as names, and indirect linking identifiers such as gender and gender identity. Direct linking identifiers has been replaced in any data that is not recordings of interviews. This is accomplished by transcripts using acronyms for names and identifiers such as twitter handles. Indirect linking identifiers was kept in transcripts only if they were necessary for context and abstracted as much as possible without losing meaning. For example, while location possibly holds significance for the data, it is possible to generalize its location. If the participant lives in Berlin, it has been replaced with "city in Europe" if it conveys the same meaning. Likewise, indirect linking identifiers are used in the thesis only when they are

strictly necessary to convey meaning.

4.1.3   Storing of data

The storing of data was conducted in accordance with OsloMets security instructions (OsloMet, n.d.), and an approval from Norsk Senter For Forskningsdata (NSD) for storing of data was obtained. Audio recordings were deleted immediately after the transcription was completed. Anonymized transcripts was kept in password protected folders on the student's personal computer and backups were stored in a OneDrive folder connected to the student's OsloMet account.

4.2   The position of the researcher

In studies involving human subjects the researcher's foreknowledge puts them in a privileged position. While the researcher has insight in the study's purpose and background, participants may have very less, or no, knowledge of the object of the study. Therefore, it is the researcher's responsibility to ensure that participants are informed and taken care of throughout the interview process (Lazar, Feng, & Hochheiser, 2010a).

4.2.1   Reflexivity

Persons that hold oppressed identities are often subject to research that does not consider the individual's perspective. Lack of knowledge, preconceived beliefs or generalization of a group can cause the researcher to ignore the individual's voice (Johnstone, 2005; Vincent, 2018). Additionally, two people that has one identity in common, might have very different experiences. A person's experience is colored by many aspects such as confidence, network and other identities a person holds, which is important to consider when one engages in this kind of research (Charmaz, 2005). ConGT emphasizes reflexivity through memo-writing and constant re-evaluation of the emerging categories (Charmaz, 2006b).

As a person that, to some extent, has had the same experiences as the interview participants, it is important to be aware of what this entails for the research. On one hand it has enabled me to recognize cues that are not detectable for persons that has not had the same experiences. On the other hand, it puts me in danger of interpreting the participants story through my own experiences and perceptions (Berger, 2015). Likewise, my privileged position as a white person with a middleclass background living in the global north, might lead to forcing meaning on the data stemming from a middleclass, global north background as well as missing cues from participants in less privileged situations (Charmaz, 2017). Being aware of my own position therefore has been imperative for both the validity of this research and for honoring the contributions of the participants.

4.2.2   Accountability towards the participants well-being

Research that discusses identity and oppression involves deeply personal experiences. Retelling of these experiences might be painful for some participants, and the interview design must be done in a way that ensures that the emotional stress put upon the participants are kept to a minimum (Corbin & Morse, 2003; Lazar et al., 2010). Additionally, some participants might have a delayed emotional reaction to the interview (NSD, 2018).The interviews included a debrief session where the participant can discuss their experience

without this being recorded or used as data later. Earlier research on intersectionality and accessibility has shown that persons can have oppressive experiences online without perceiving them as consequential (Skjerve et al., 2016). While it might be relevant for the research to explore these experiences with the participant, it is important that this exploration is conducted in a way that does not create new psychological distress to the previous experience or adds to distress or fear of resembling experiences in the future.

4.2.3   Informed consent

Before the interview starts, the participants should be provided with enough information to make a well-founded decision of whether they want to participate or not. This information includes reasons for conducting the research, what will be discussed in the interview and possible risks, in this case mental distress. It is also important to make clear that participation in the study is voluntary and that choosing to end or withdraw from the interview is possible throughout the interview process (Lazar, Feng, & Hochheiser, 2010b). When working with vulnerable groups such as children and persons with (dis)abilities, it is important to consider the participants capacity to consent and offer additional resources if necessary, for example the help or explicit consent from the participants parent or legal guardian (Lazar et al., 2010b). It is important to note that the consent should never be obtained from the guardian alone, but through a conscious cooperation with the participant (Carey & Griffiths, 2017).

The participants in this study were adults that did not require assistance in the process. The informed consent was obtained in two ways; when possible, a written consent form was provided to the user. In video chats, the information and consent was given orally before the start of the interview.

5   Results

In the interviews, the participants discussed use of technology in various aspects; early encounters, daily use, positive and negative sides. There was a sentiment among most of the participants that one lucky circumstance or another had made them able to adapt and use technology in their daily life. Families that encourage and support their use of ICT, experience with technology at an early age and access to technology by employers were described as privileges not available to everyone. This section presents three emerging themes; Cost and Affordability, Exclusion and Aggression Online and Learning digital skills.

5.1   Intersectional Experiences

The experiences recounted by the participants illustrated how barriers are created in the intersection between identities and technology. OB described her difficulties in taking advantage of opportunities for persons with (dis)abilities;

> *"I need to reach there first. […] Just imagine the bus, public busses, they don't have accessible platforms for the people in wheelchair, and, some drivers, most drivers, they are not playing the audio announcing [the stops], something like that. [...] And I'm not economically privileged person to take a taxi all the time, and plus, it's dangerous, especially for woman who is blind"*

In this example, OB encounters a barrier created in the intersection between gender, socio-economic status and (dis)ability that is distinctly different from the barrier a man or a person with a high socio-economic background would encounter.

5.2   Cost and Affordability

Many of the participants discussed the effect cost and affordability have had on their use of ICT. Amongst the most discussed was the cost of assistive technology. GC, a participant from the Global South, highlighted licensing fees for assistive technology software, and discussed strategies to circumvent this issue;

> *"…I was using this software which was […] on a demo mode... only for 40 minutes, so I had to restart the computer... Because I could not afford to get that software [...] I understand that [brand name of software] is pretty expensive to have and ... there are other screen reading software […], which people are now using in place of [brand name of software]. So that […] route has to be taken to make technology much more affordable for people, for countries which just cannot afford to get technology."*

In addition to licensing fees, the participants talked about cost of the equipment itself. One of the participants, KC, reflected on how their professional background necessitated high quality hearing aids, and the extra cost that accompanied it. According to the participant;

> *"my hearing loss is bordering on deafness while my education and professional background require exceptionally good hearing aids so that I can work with people in different languages and actually understand speech, not just hear sounds, so for me these expensive hearing aids are the best but there is a limit of insurance compensation [and] for some people, like [...] people with age-induced hearing loss, this can be more than enough but not for me because it is not only a matter of amplification, it is matter of fine-tuning [hearing aids].*

MG, similarly considered how cost affected her use of assistive technology when her insurance company changed their policy. According to the participant;

> *I have [...] had the benefit of insurance when it comes to technology [...] in terms of fixing things, particularly disability related, [...] for example my insurance company... originally payed for my wheelchair, [...] but now the rules have changed and now they no longer pay for anything related to the titanium chair, so even though they paid for it originally they will not pay for any kind of repair.*

Another of the participants addressed the indirect cost of acquiring language skills. A participant living in the Global South, OB, highlighted the necessity of knowing English to access ICT. According to the participant;

> *"The factor which helped me a lot to acquire the screen reader with computer is because I had a good English already. From my [...] days of employment, that helped me a lot, that was fundamental and [...] even though the youth and young generation they want to study English [...the] language center fee is very high, and language is not something that they can learn and acquire good skills as soon as right after they completed one training, one course."*

OB further described how not having access to equipment, or sharing this equipment with others might affect a person's use of ICT.

> *"[...]he was taught several times how to use screen reader and, but he didn't have any laptop at home. And... Because, we need to install our screen reader, and it's hard for us to share with people. Even though he installed, or his ... Family members, like, get virus, infected with virus. And they formatted, and he needed to install the screen reader again, and at the same time he didn't have any English language literacy. So, his computer usage is still very low even now. "*

5.3   Exclusion and Online Aggression

When discussing encounters on the web, the participants described unpleasant experiences as something to be avoided, but also expected. While consequences in general was avoidance of already unpleasant discussions, many of the participants described hesitancy and even choosing not to comment due to fear of unpleasant development after their entrance in the conversation. The participants also described various degrees of psychological burden in interactions online. MG provided an example of their experience with hate speech stating;

> *"[...] There was some hate speech that was going on that resulted in somebody […] kind of hating their own life and not worth living and that whole thing, so it was this whole discussion that really escalated and made somebody, […] feeling pretty worthless […] having to, kind of, navigate that was hard and […] scary actually, pretty scary"*

In recounting, the participants often framed the stories as learning experiences on how to act and not to act. The participants described various strategies in moderating behavior and online appearance to avoid online harassment. The most common strategy was disengaging in debates or lessening the presence of identity either in appearance or response. One participant, CP discussed a strategy of minimizing the presence of gender in her appearance online;

> *"[...] I can't use a picture […] on [social media]. That's difficult. I mean, I notice a difference between using a picture of mine and using a random picture [...] they try to interact with you, and they add you, and they want to speak with you but that's easy to avoid. Because I mean, you can just delete their request, and that's easy. [This] usually happen when you comment on things. Because, you say something, so they see you. If you just read, mostly nobody will care because they don't see you. The other thing is when they insult you because they don't agree with something you said. And then it's, like, sexual right away."*

Another participant, SI, further discussed the frustration over the decision process and considerations when deciding whether to participate in online debates;

> *"You go, like, 10,000 rounds with yourself, even if you have an opinion and you want to express it, you go 10,000 rounds with yourself. Because you don't want to deal with the backlash. If you are disabled, or disabled and queer, or if you are disabled and Muslim or woman, or man, or whomever you want to be [...] or have an immigrant background.... it doesn't help."*

SI used to work in a civil society organization for youth empowerment and further discussed how exclusion and aggression online affected the way the youths in the organization used ICT. According to the SI;

"I often speak to the youths in the organization where I was very active and worked before [...] about writing [blog and social media] posts [...] they write posts, but then suddenly they don't want them published [...] because they are scared of [...] when it gets out in the public, what reactions they will get."

5.4   Learnability

Difficulties with learning digital skills either for themselves, their peers or family were described by many of the participants.

Language was described by many of the participants from the global south and/or with experience of transnational immigration. GC described the advantage he had over his non-English speaking peers when learning how to use computers;

"So linguistically speaking I had a prime advantage, or [...] head start compared to other people, other colleagues of mine who were predominantly relying on, for instance, local or regional languages. [...] for instance, what is meant by a menu [...] these ideas I could visualize, and it came to me naturally a bit. But for my colleagues and friends growing up, they were like 'what is a menu?'"

On a different level, SI described difficulties in learning to use technology in a second language, even when the person speaks the language well. She stated that the language combined with unfamiliar concepts created a new level of understanding. According to SI ;

"Suddenly, it gets very complicated. Even the ones that are trying really hard, like, want help from... I know people that came here... and have lived here for so long, speaks [language of resident country], but when they go on... When it comes to PCs, kind of, and going on homepages and things like that..."

Another issue described by the participants, was the lack of different forms of instructions and learning material. LB, discussed her experience with adopting assistive technology as an adult with an acquired (dis)ability. The participant about her experience as a hearing aid user;

"Not being [told], 'do this, do this', I want to observe the person first. I've got photographic memory, I pick up better by seeing what others are doing with their fingers, where they press, then I get it. Most of time, for technology I don't get it, I don't understand. And my first kind of reaction, show me. That's what makes sense"

LB further described how difficulties with technology interacts with the exclusion experienced by persons that has an acquired hearing impairment in loss of confidence.

"They bring out this anger about, you know, [...] something I don't understand [...] especially for people who are hard of hearing, who have lost the easy way of doing things like communicating on the phone for example [...]that's another layer of feeling being excluded, and that's how you lose your confidence."

The women in the study often described the dependency on other persons in learning, using and maintenance of ICT equipment. CP illustrated the relationship between gender and learning digital skills arguing,

"I grew up thinking I didn't understand technology. [...] Because I had some male friends that are very good at technology like programming or fixing problems, [...] I always called them when I had problems."

When discussing the older generation, most of the participants said that as a rule, women used technology less than men. While the participants was not sure of the reason for this, they theorized that skepticism, lack of interest or plain stubbornness was plausible causes. OB about her mother's relationship to technology;

"[...] my mom still refuses. She still will not adopt [...] technology, even some basics. I don't know what it is, but it's no way, she's [...] stuck in her ways. My dad on the other hand, he was the gadget man, he love gadgets..."

The participants that had adopted technology at an early age, expressed that they felt more comfortable with technology. The participants described encouragement and support from their families as an important factor for their early adaptation. For some this involved introduction to assistive technology. KC discussed how her mother introduced her to assistive technology. According to the participant,

"my mom put a hearing aid on me when I was two [years old...] and thanks to this, she could start teaching me to speak because doctors were saying 'your kind will end up in deaf school and will never speak', so she was training me all my childhood, and I managed to study at a mainstream school with extensive learning of English [...] thanks to my hearing aids [...] that's the most important example of how technology affected my life

For others, social support was the most important aspect. SI described her experience with her family encouraging and participating in her learning to use technology. According to the participant;

"Everybody encouraged me to do it... We played together, I played together with my cousin. [...] I learned to play together with my uncle too, [...] Dad started encouraging me to, because he was so busy at work, that I could write, kind of, a diary that he could read when he came home, a letter to

him.”

Yet another aspect mentioned was the prioritization of acquiring technology for the home, even under difficult economic circumstances. MG about the family's first computer;

> *"First computer was just […] a hand-me-down, a very kind of clunky old computer, we had it [a computer] at school, so I think my family wanted to try […] having that at home as well, having that to use at home. And mostly used for educational purposes."*

6   Grounding intersectional accessibility

Developing a fully-fledged grounded theory on intersectional accessibility is beyond the scope of this master thesis. This section therefore, presents a preliminary model that can give direction to further enquiry.

Four significant codes that describes intersectional processes in ICT accessibility was identified; cost and self-perception are codes relating to processes between various forms of discrimination and ICT. Confidence and "online misgivings" are centered around the process of "learning behavior", how meetings between intersectional identities and technology shapes and affects the way persons interact with technology.

The codes are presented separately, but this does not imply that they are separate entities, or unrelated. Intersectional accessibility, as with the case of intersectionality in general, consists of complicated and interlinked barriers and processes. For example, the code Self-perception could be described as an instance of unfamiliarity (described in 6.2 Confidence). They are separated because each clarify different aspects of the intersectional accessibility process.

The emerging theory shows that intersectional accessibility is more than single instances of barriers. It is the creation of barriers through intertwined processes where lack of consideration for power and privilege manifests in less accessibility for persons with (dis)abilities that holds intersectional identities.
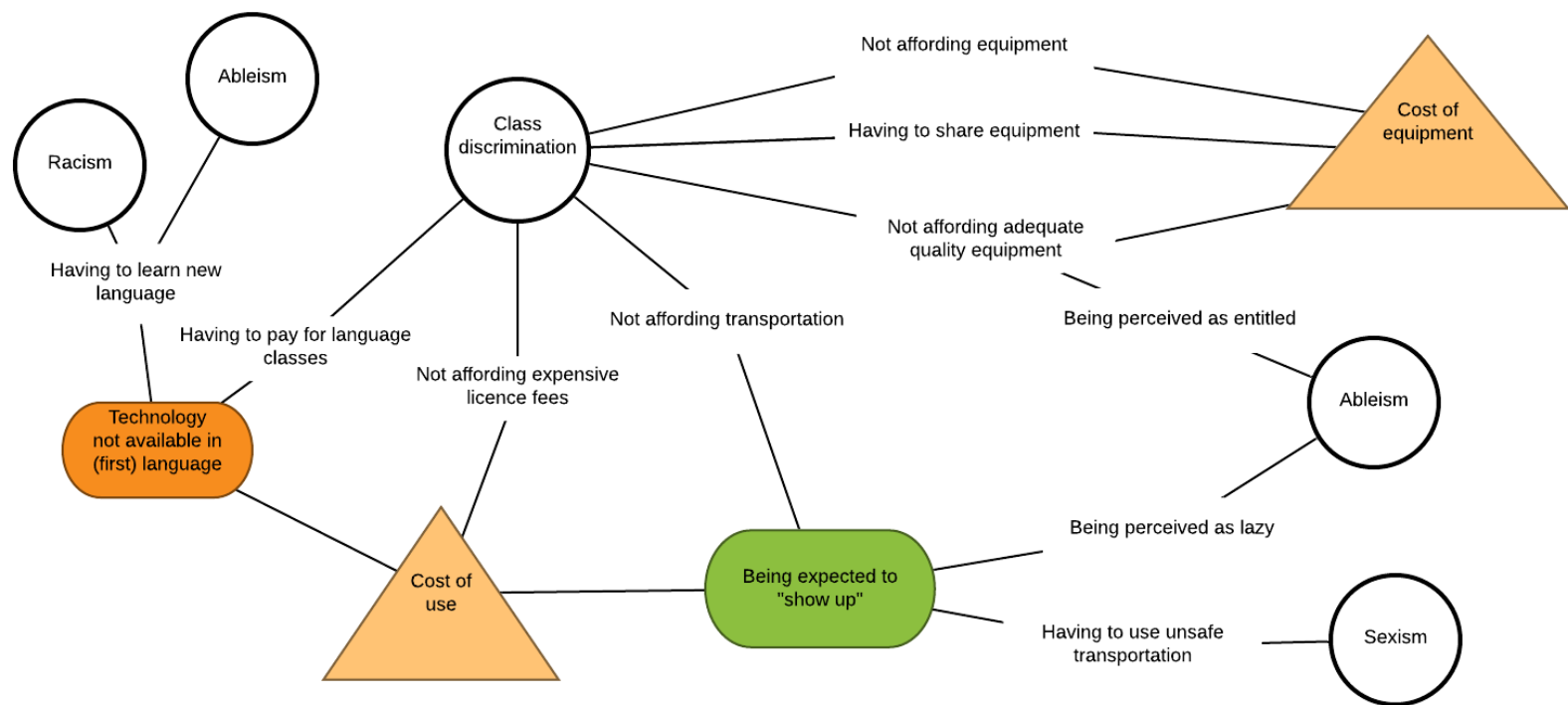
6.1 Cost barriers

Figure 6.1 Cost barrier instances and processes, a textual representation can be found in Appendix A i) Cost barriers

The basic mechanisms behind cost barriers are closely related to class; Cost of equipment and cost of use.

6.1.1 Cost of equipment

The monetary cost of equipment prohibits persons with a low income from having access to equipment altogether, or to using equipment that is inadequate for their needs. Furthermore, the need for higher quality equipment for persons with (dis)abilities are often met with non-understanding, adding a layer of non-monetary cost where a person with (dis)ability must contend with ableist prejudices when attempting to obtain equipment.

6.1.2 Cost of use

The cost of use is a secondary instance of access. While the equipment might be accessible, the person must fulfill other criteria to be able to use the equipment, for example being at an organization's office. Being expected to show up is an *in vivo* code, a code that was used by one of the participants, which illustrates the dynamic between intersectional identities and technology where oppression from one system reinforces and reproduces others. Being expected to "show up" has a very clear annotation; if technology is available the only hindrance is your own will to access it. However, "showing up" poses its own set of barriers.

If the technology is only available in languages that a person has less or no skills in, they will be required to acquire the necessary language skills. This might add an additional barrier in terms of having to pay for language classes as well as barriers for persons with cognitive

32

disorders.

As a direct monetary cost, licensing fees prevents persons with a low income to access or having to make practical arrangement to circumvent the cost. For example, if the software has a free version with limited functionalities or restrictions, a person can choose to work with the restrictions as in the case of GC that rebooted his computer every time the time limit of their free version was up. These practical arrangements often requires pre-knowledge of technology, which reproduces already existing barriers regarding knowledge of technology. Furthermore, language barriers might be reinforced by the need to understand how to work with the restrictions.

Beyond the technology itself, being expected to show up also applies to the expectancy being physically present at a location. A person with a disability might not have the possibility to get to this location depending on temporal health conditions and accessibility of transportation. Likewise, a person with a low income might not be able to pay for transportation. Combing these two, affordable transportation for a person without disability, might be inaccessible for a person with a disability so a person with a disability and low income will face a double barrier in that there might exist accessible transportation options, but will still be inaccessible due to financial reasons. Furthermore, for women especially, various forms of transportation will put them at risk of violence. In other words, monetary cost is just a small part of the barrier faced by persons with intersectional identities. A woman with a (dis)ability must contend with both accessibility, economical *and* safety barriers before she will get to a point of "showing up". In the end, if she is unable to mediate all these barriers, her absence will be interpreted as a lack in will, or just plain laziness, which might prevent her from accessing the same opportunities in the future.
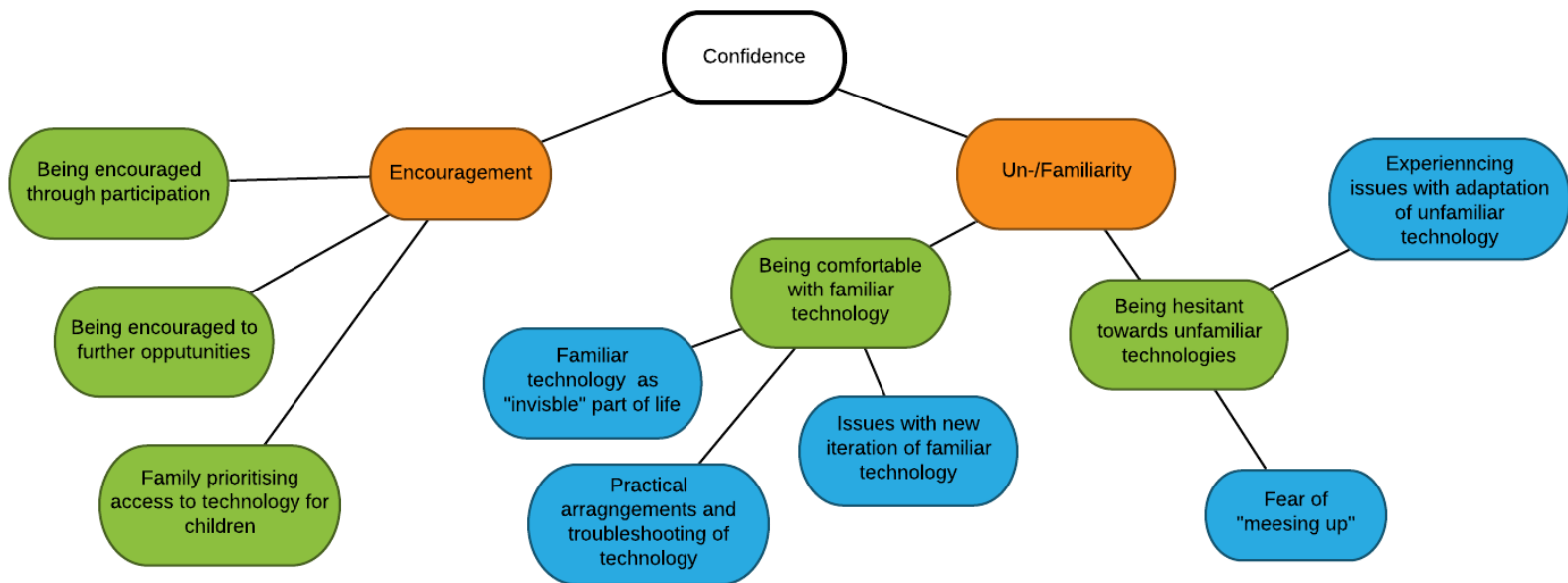
6.2 Confidence

Figure 6.2 Confidence processes, a textual representation can be found in Appendix A ii) Confidence

Having confidence in "the meeting" between the user and technology directly affects a person's way of interacting with the technology. The more a person perceives themselves as capable of handling the technology, the more flexible their use and adaptation of new technology is. Two major processes as contributing factors to confidence; encouragement from family and un-/familiarity.

6.2.1 Encouragement

Experiencing support and encouragement, especially in childhood, creates space for a person to develop their digital skills. In encouragement the persons builds confidence towards their right and capability to learn, and use, technology. This encouragement can come from different sources, but one of the most common is family.

Technology as a participatory activity, for example playing video games together, allows a person to use their acquired skills as well as developing new through observation and instructions. As a contrast to one-way instructions, participatory instructions is a back-and-forth where all parties participate in the activity.

Validation of the right to learn technology (the justifiableness of spending time on technology as opposed to other duties) is important, especially for women. The understanding and assertion from parents that technology skills are important and will contribute to a child's opportunities later in life is a validation of this right. A further validation of the right to learn technology is when a family with low income prioritizes access to technology for their children. With this prioritization the parents creates an understanding of technology skills as important and places an implicit value on technology. As a person broadens their skills and confidence in technology, encouragement in form of

validation of progress and value furthers a person is a further factor that contributes to confidence.

6.2.2 Familiarity

Familiarity here, describes a situation where a person is so used to technology artifact that use of it is not experienced as an interruption in the person's daily life. The familiarity with the technology gives the person an underlying confidence which manifests in flexibility both in terms of use, practical arrangements and troubleshooting. For example, a person using a familiar laptop at work, does not stop to consider the consequence of each action performed on it. They will make practical arrangements such as placing the laptop in a way that allows for a better sitting position even if they have not seen it done before. And if they encounter issues they will often try, and be able to, troubleshoot the issue themselves. The flexibility that familiarity affords a person is not directly linked to confidence in use of technology in general. A person with very little confidence in use of technology will have just as much confidence with use of the familiar technology as a person that has a high confidence in general. In some sense one could say that a person that has a high degree of confidence in use of technology experiences familiarity towards technology in general.

Unfamiliarity is the opposite of familiarity; when a person experiences some technology artifact as foreign and use of it is experienced as an interruption in their daily life. The point at which unfamiliarity occurs varies with the degree of confidence in technology use. A person with a high degree of confidence will not think twice about using a new smart phone application, while a person with a low degree of confidence might experience the same as very unfamiliar. For a person with high confidence, the act of pressing a button they have not seen before is trivial because they feel confident that they can predict the consequence of the action and that they will be able to correct a mistake if it occurs. In contrast, a person with a low degree of confidence will be more hesitant due to a fear of "messing up something". That an error, if one is made, will be fatal. The feeling of unfamiliarity is reinforced when a person experience issues with the technology, because unfamiliarity does not allow the user confidence in error correction. Persons that experience a high degree of unfamiliarity with a technology is more likely to give up the use of it.

Un-/familiarity is not static entities. An unfamiliar technology might become a familiar technology with prolonged use, or if the user is able to recover from errors. A familiar technology might become unfamiliar if repeated complicated issues arise that the user is not able to correct. Likewise, experiencing familiarity with technologies can contribute to more confidence with use of technology, and unfamiliarity might lessen it.
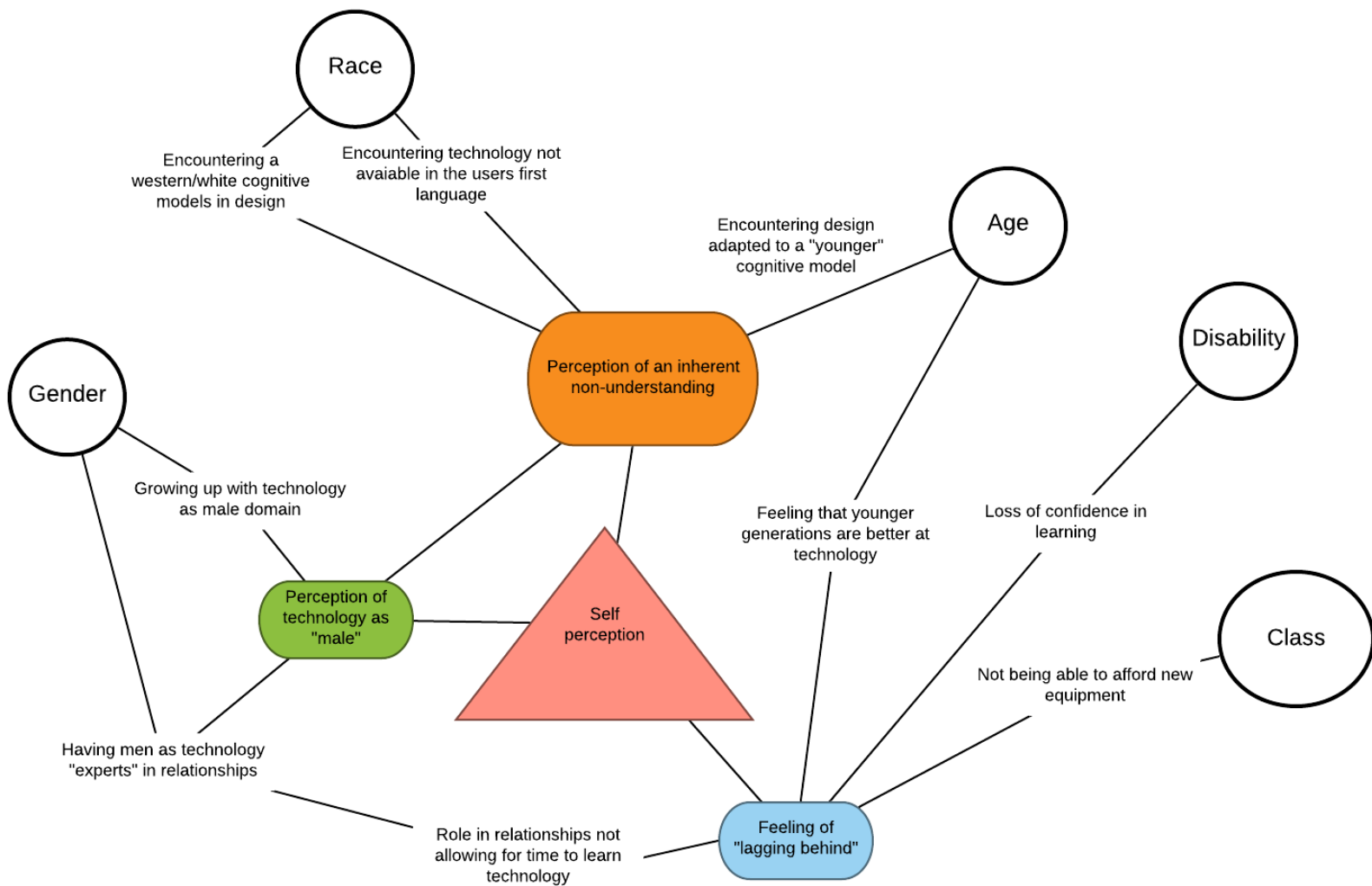
6.3   Self-perception

Figure 6.3 Self-perception processes, a textual representation can be found in Appendix A iii) Self-perception

Various forms of oppression and encounters with barriers related to these shapes a person's self-perception. Self-perception is an experience of being less capable of using and learning technology. This takes on the form of comparison in perceiving that others are more skilled or learn faster, but it also occurs due to a pattern of encountering technology that is designed in a way that does not fit cognitively.

6.3.1   Perception of technology as "male"

Technology is often perceived as a "male" domain, in other words that men has an inherent better understanding and interest for technology. Girls grow up with an expectation of not being interested and having less skills in the sole capacity of not being a boy. These expectancies often manifests in girls becoming less interested in technology, and consequently developing less skills. The expectation that they, or women in their networks, are less capable also translates into a behavior of asking men for assistance when there is something wrong with their technology, instead of trying to fix the issue themselves. This behavior continues into adulthood where men often are prescribed as the "tech-expert" in

36

relationships, which reproduces the perception of technology as a male domain. Furthermore, the designation of technology as the man's job in a relationship requires the woman to take on other roles that does not allow for time to technology.

6.3.2 Lagging behind

Lagging behind is a code that describes the situation, frustration, and sometimes embarrassment, that a person experiences when comparing their familiarity with technology to other entities. Lagging behind occurs when one, or more, barriers makes it harder for a person to adopt advancements in technology. In other words, it is a product of barriers which becomes a barrier in itself.

The rapid development of technology has introduced a range of opportunities; however, new equipment is often expensive. In a class perspective, lagging behind occurs when a person that cannot afford new equipment compares their progress and adaptation with persons that can afford it. For elderly persons, usability relies on a translation of older interaction concepts. This translation is sometimes complicated, especially if the person experiences less familiarity with the technology they already use. Growing up with technology contributes to a higher degree of familiarity. Lagging behind here, occurs when a person that did not grow up with technology compares their progress and adaption with younger generations. A person that experiences a change in way of functioning, for example loss of hearing, goes through a process of re-learning. This process is often accompanied by a loss of confidence. Lagging behind here occurs in two distinct ways; unfamiliarity towards technology that was familiar before and unfamiliarity towards assistive technology. Another instance of "lagging behind" occurs when a person has delegated technology to another person and consequentially takes on roles that is not related to technology. For example, in a family, if one parent has become the "tech-person", responsibilities that is not technological will fall to the other. Consequentially, the "tech-person" will continue in developing their skills while the non-tech person has even less time to learn.

Lagging behind makes adaptation of new technology increasingly harder as concepts and design changes. Furthermore, the psychological aspects might contribute to a person not asking for help and giving up on a piece of technology because they perceive it as out of their reach.

6.3.3 Perception of inherent non-understanding

Perception of inherent non-understanding describes a situation where a person has developed a perception of themselves as not being able to understand technology. That there is something about their way of thinking and understanding the world that is incompatible with technology, a complete unfamiliarity. Perception of inherent non-understanding is a product of barriers created by societal prejudice and technology whose usability is based on incompatible cognitive models.
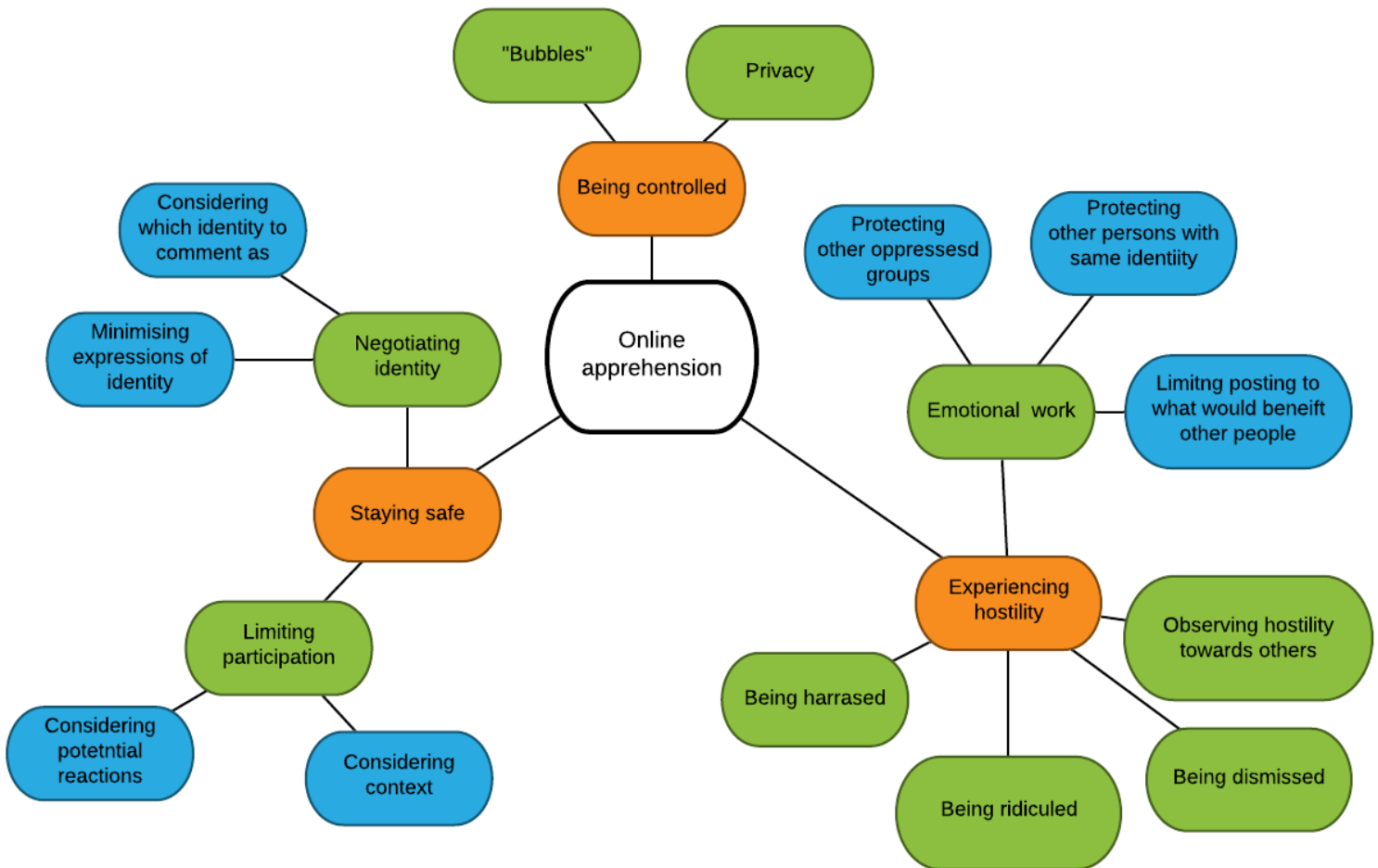
6.4 Online apprehension

Figure 6.4 Online apprehension processes, a textual representation can be found in Appendix A iiii) Online apprehension

Online apprehension describes a cautiousness in ways of interacting with the world wide web as a product of previous experiences and shared knowledge such as "data about me is being used by corporations" or "women that speak out in the wrong context online gets hurt in the physical world".

6.4.1 Being controlled

Being controlled refers to a person's reflections on "down-sides" of their participation, especially in the context of social media. It is often experienced as a situation where their own behavior is used by the underlying infrastructure of the web to shape their reality. Being skeptical is a balancing act between a person's intuitive behavior and behavior to achieve a change in situation.

Privacy describes an uncertainty of what is, and should be, available to other entities of a person's data and how this data is being used. As a safety concern, the question of *who* accesses their personal information and what *use* it can be put to is weighed up against visibility as an *obligation*. For example, visibility is a form of activism for persons with

oppressed identities. Visibility serves as a reminder of existence on the one hand, on the other it might lead to an exposure of a person's identity that might have negative consequences. The other concern is the exploitation of the information shared by a person by corporations or organizations.

"Bubbles" describes a person's experience of being fed data according to characteristics and previous activity. This creates unease for the user in several ways; Firstly, an experience of the underlying infrastructure "knowing too much", similar to a violation of privacy where detailed or intimate information is being diffusely distributed to unknown parties. Secondly, data based on characteristics can be stereotypical, like women in their late 20's being fed commercials about pregnancy tests. Thirdly, it creates a feeling of unhealthy isolation where you only are fed information and conversations you agree with. It is an experience of having your own behavior used against you by the underlying magic of the internet. This is a concern both in terms of own perspectives, but also a fear for what is happening "elsewhere" when their own perspectives is missed.

6.4.2 Experiencing hostility

Experiencing hostility is a situation mostly present in online discussion. It occurs when a person experiences sanctions for participation either in the discussion itself or other direct contact.

Being harassed is an experience of aggression. It occurs when a person due to identity is subject to unwanted attention either through derogatory comments or when boundaries are not accepted for example through prolonged attempts of contact when a person has stated that it is not wanted.

Being ridiculed or dismissed occurs when claims are made that a person's point of view is irrelevant because of the identities a person holds. Assertions such as, this is only interesting to you, your identity makes you incapable of understanding this.

Observing hostility towards others is a secondary experience of hostility. While it is not directed at the person, it teaches the person that if they interact the same may happen to them.

6.4.3 Staying safe

Staying safe describes strategies that a person has developed to avoid hostility. Staying safe occurs through careful consideration towards what is the best behavior to avoid an excessive amount of hostility online. Staying safe has both negative and positive connotations. On one hand it is behavior that makes a person feel confident and free to interact in safe contexts. On the other hand, safe context is highly subjective, and some might find that very few contexts are safe. This is both frustrating and limiting.

Limiting participation is the process of evaluating what is the most probable outcome of an interaction and whether this is within a person's comfort zone. Considering context is the process of deciding whether the current context allows for a positive interaction. The decision is made based upon earlier knowledge of the context, observation of current

behavior in the context, and the person's goal for interaction.

Negotiating identity is the process of lessening expressions of identity with the purpose of avoiding harassment. This is performed either through visual means such as lessening identity expressions in pictures, or textual means such as change in language to appear more "normative".

7   Discussion

This thesis began with addressing the need for more knowledge about experiences and barriers in encounters between ICT and persons with (dis)abilities that holds intersectional identities. This section argues that the question posed in the introduction, "How does intersectional oppression affect the use of ICT and create new barriers?", has answers both in the form of specific barrier instances and in the form of processes that creates barriers. The specific instances; Cost and Affordability, Exclusion and Online Aggression, and Learnability illustrates that a person with (dis)abilities that holds intersectional identities has distinctly different experiences than a generalized disabled person. The processes: Cost barriers, Confidence, Self-perception and online apprehension; develops a richer insight into the complex interactions between identities, oppression and technology that creates new barriers.

Previous research shows that persons that holds intersectional identities experiences unique forms of oppression in their use of ICT, for example in the way they are harassed online (Felmlee et al., 2018). Likewise, research on (dis)ability and intersectionality has shown that persons with a (dis)ability that holds intersectional identities experience oppression in forms of less access (Chaudhry, 2016; Moodley, 2019; Moodley & Graham, 2015b). The findings in this study extends this knowledge by exploring these experiences through an ICT barrier analysis, showing that persons with (dis)abilities that holds intersectional identities experiences unique barriers in the intersection between ICT, (dis)ability and other oppressed identities.

In Critical Disability studies and Crip Theory, (dis)ability and (dis)ability identity is explored through processes and encounters between the body, the physical and societal environment, and knowledge (Connell, 2011). This study shows that intersectional barriers has commonalities with this model, showing a complex interaction between identity, technological and structural barriers, and acquired knowledge. This approach differs from earlier approaches to universal design in that barriers are seen as both technical (for example screen reader incompatibility), structural (for example licensing fees), and as processes that reacts to, and reproduces each other. The findings reinforces the criticisms of the oversimplicity in the *anonymous* and the *reductionist all* (Frauenberger, 2015; Hamraie, 2013b; Winance, 2014), by demonstrating the complexity in a person's access and use of ICT.

The findings in this study confirms that the criticism of the *economical all* and the *anonymous all* as mechanism of exclusions (Fuchs & Obrist, 2010; Hamraie, 2015) is a relevant concern for universal design of ICT. Beyond the monetary cost, the findings show that cost barriers are created through processes that creates and reinforces barriers related to privilege and power. For example, the conception of (dis)ability as an issue of will, as portrayed in inspiration porn (Grue, 2016; Hadley, 2016), justifies the existence of criteria for accessing technology. Furthermore, a person that is not able to meet these criteria experiences repercussion in terms of being perceived as lazy, reinforcing the already existing attitude and blocking the person from further participation. Likewise, unfair algorithms

employed by governments and companies, can block a person's access to insurance or necessary quality of equipment (Altman et al., 2018; Lecher, 2018) .This reproduces direct monetary barriers as well as ableist stereotypes about persons with (dis)abilities.

Previous research has shown that women that holds intersectional identities are more likely to experience violence and aggression both in real life and online (Felmlee et al., 2018; Gauthier & Sawchuk, 2017; Meer & Combrinck, 2015). Recounts from women in this study about instances of harassment and aggression specifically targeted at, or justified by, their identities shows that this is also a concern specific for women with (dis)ability. In addition, the women described situations where they have had to intervene to protect other persons experiencing aggression, and observations of severe consequences by aggression online. Previous research shows that persons with (dis)ability that holds intersectional identities considers encounters with hostility online as something to be expected. They do however experience these encounters as uncomfortable and deploys various strategies to avoid them(Skjerve et al., 2016). This thesis develops the insight through exploring these strategies and how hostility affects a person's use of ICT through processes of learning behavior. It expands on the findings of emotional that is required by women on Wikipedia (Gauthier & Sawchuk, 2017; Shaw & Hargittai, 2018) by identifying other areas, such as defending others, were emotional work is necessitated by a feeling of responsibility.

Previous research has shown that persons from oppressed groups experience frustration and lack of confidence in interactions with technology (Lin & Hsieh, 2016, Sarkar et al., 2016; Huang & Yuan, 2017; Oyibo & Vassileva, 2017) which coincides with opinions expressed by the participants in the study. This thesis further explores the underlying processes that creates these encounters connecting them through direct, and indirect intersectional barriers.

The findings in this thesis shows that intersectional accessibility is a concern well beyond user interfaces. Research into algorithmic unfairness has shown that oppressed identities experience a significant amount of oppression through algorithms (Baker & Potts, 2013; Banner, 2019; Barocas & Selbst, 2016; Brock, 2011; Introna & Nissenbaum, 2000; Karapapa & Borghi, 2015; Miller & Record, 2017). In addition to direct monetary cost mentioned earlier, the participants in this thesis expressed concerns about the way their personal information was used online. While they did not address the issue of algorithmic unfairness, this implies that the employment and opaqueness of algorithms creates an extra dimension in online apprehension among persons with intersectional identities.

Feminist and CDS scholars has addressed that dependency as a failure is a construct, claiming that the vulnerability of the human body and mind is an inherent dependency that is present in families and friendships (Garland-Thomson, 2011). The findings in this study shows that dependency is an integral part in accessing and using technology. Being encouraged through participation has been important for many of the participants in acquiring digital skills . On the other hand, needing help can translate to self-perceptions of lagging behind and inherent non-understanding. In the first case, dependency is not

understood as a failure. In the second however, it is seen as failure and contributes to self-perceptions that prevent access to technology.

8 Limitations

The results from this study is based on 11 interviews with persons holding a variety of oppressed identities. Due to the small size some limitations must be addressed, specifically towards composition of the group and generalizability of findings from such a small sample.

The wide scope of identities was a conscious decision because this study explores the applicability of intersectionality as a universal design framework overall, not just for one or two identities. However, it is not a complete picture. Many identities are represented, but it is far from all, and while varying in socio-economic status and background, all participants has had education . Furthermore, a wide scope in terms of identities does not allow for an in-depth analysis of experiences and barriers for any specific group of identities or for example a Black (dis)abled man's experience will be vastly different from a white (dis)abled women's experience. Likewise, differences in situational context, for example place of living, is an area of inquiry for further research.

9 Conclusion

Research on universal design of ICT and intersectionality has yet to produce a comprehensive understanding of intersectional barriers and accessibility (Giannoumis & Skjerve, 2020 ; Giannoumis & Stein, 2019; Skjerve, et al., 2016). This thesis provides a model depicting intersectional barriers as instances and processes, which can inform further research and identify possible areas of intervention.

While the findings in this thesis is a useful contribution towards understanding intersectional accessibility, it is far from a complete model or theory. Future research should continue the evolution of this knowledge by data collection among persons with identities that were not included, as well as focused research on specific themes or groups of identities. Additionally,

The identification of commonalities presented in this thesis opens up an exploration on how barriers related to these are created and manifests within specific groups. For example, what processes within confidence is especially important for elderly women with disabilities? What encounters with technology are present in these processes? Furthermore, it can be used as a tool to recognize where we as researchers, developers and designer reproduce inequality through assumptions and practices that does not consider oppressive systems.

The findings in this thesis provides a tool for practitioners within universal design of ICT to take a critical stance towards our own practices both in coding and design. Firstly, developers must consider the societal implications of coded algorithms. Secondly, the processes and barriers described in the model can unveil new forms of interaction such as participatory interactions that does not produce a sense of failure. It could also inform the design of more nuanced and complex personas avoiding the issue of stereotyping.

In terms of policy the findings illustrates that existing polices about accessibility might not only be insufficient, but actually contribute to exacerbate existing inequities. As the ageing population becomes more and more diverse (UN Department of Economics and Social Affairs, 2017)inequities in ICT accessibility will have major implications for necessary access, such as access to government services. Future policy therefore, should include a wider understanding of accessibility.

10 Acknowledgment

11   References

Adam, A., & Kreps, D. (2009). Disability and Discourses of Web Accessibility. *Information, Communication & Society*, *12*(7), 1041–1058. https://doi.org/10.1080/13691180802552940

Adams, J., Brückner, H., & Naslund, C. (2019). Who Counts as a Notable Sociologist on Wikipedia? Gender, Race, and the "Professor Test." *Socius*, *5*, 2378023118823946. https://doi.org/10.1177/2378023118823946

Altman, M., Wood, A., & Vayena, E. (2018). A Harm-Reduction Framework for Algorithmic Fairness. *IEEE Security Privacy*, *16*(3), 34–45. https://doi.org/10.1109/MSP.2018.2701149

Baker, P., & Potts, A. (2013). 'Why do white people have thin lips?' Google and the perpetuation of stereotypes via auto-complete search forms. *Critical Discourse Studies*, *10*(2), 187–204. https://doi.org/10.1080/17405904.2012.744320

Banner, O. (2019). Technopsyence and Afro-Surrealism's Cripistemologies. *Catalyst: Feminism, Theory, Technoscience*, *5*(1), 1–29. https://doi.org/10.28968/cftt.v5i1.29612

Bardzell, S. (2010). Feminist HCI: Taking Stock and Outlining an Agenda for Design. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 1301–1310. https://doi.org/10.1145/1753326.1753521

Barocas, S., & Selbst, A. D. (2016). Big Data's Disparate Impact. *California Law Rewvied*, *104*(3). http://dx.doi.org/10.15779/Z38BG31

Berger, R. (2015). Now I see it, now I don't: researcher's position and reflexivity in qualitative

research. *Qualitative Research*, *15*(2), 219–234.

https://doi.org/10.1177/1468794112468475

Berghs, M., Atkin, K., Graham, H., Hatton, C., & Thomas, C. (2016). *Scoping models and*

theories of disability. Retrieved from

https://www.ncbi.nlm.nih.gov/books/NBK378951/

Bidwell, N. J. (2016). Decolonising HCI and Interaction Design Discourse: Some

Considerations in Planning AfriCHI. *XRDS*, *22*(4), 22–27.

https://doi.org/10.1145/2930884

Billestrup, J., Bruun, A., & Stage, J. (2016). Usability Problems Experienced by Different

Groups of Skilled Internet Users: Gender, Age, and Background. In C. Bogdan, J.

Gulliksen, S. Sauer, P. Forbrig, M. Winckler, C. Johnson, … F. Kis (Eds.), *Human-*

Centered and Error-Resilient Systems Development (pp. 45–55). Springer International

Publishing.

Brock, A. (2011). Beyond the pale: The Blackbird web browser's critical reception. *New*

Media & Society, *13*(7), 1085–1103. https://doi.org/10.1177/1461444810397031

Bryant, Anthony, & Charmaz, K. (2011). Introduction Grounded Theory Research: Methods

and Practices. In *The Sage Handbook of Grounded Theory* (pp. 1–28). SAGE.

Carey, E., & Griffiths, C. (2017). Recruitment and consent of adults with intellectual

disabilities in a classic grounded theory research study: ethical and methodological

considerations. *Disability & Society*, *32*(2), 193–212.

https://doi.org/10.1080/09687599.2017.1281793

Chadwick-Dias, A., McNulty, M., & Tullis, T. (2003). Web Usability and Age: How Design

Changes Can Improve Performance. *Proceedings of the 2003 Conference on Universal Usability*, 30–37. https://doi.org/10.1145/957205.957212

Charmaz, K. (2005). Grounded Theory in the 21st Century: A Qualitative Method for Advancing Social Justice Research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of Qualitative Research* (3rd ed., pp. 507–535). SAGE.

Charmaz, K. (2006a). An Invitation to Grounded Theory. In *Constructing Grounded Theory* (second, pp. 1–13). London: Sage Publications.

Charmaz, K. (2006b). Coding in Grounded Theory Practice. In *Constructing Grounded Theory* (second, pp. 42–71). London: Sage Publications.

Charmaz, K. (2017). The Power of Constructivist Grounded Theory for Critical Inquiry. *Qualitative Inquiry*, *23*(1), 34–45. https://doi.org/10.1177/1077800416657105

Chaudhry, V. (2016). Living at the Edge: Disability, Gender, and Neoliberal Debtscapes of Microfinance in India. *Affilia*, *31*(2), 177–191. https://doi.org/10.1177/0886109915622525

Collins, P. H., & Bilge, S. (2016). What is intersectionality? In *Intersectionality* (pp. 1–29). Retrieved from https://www.wiley.com/en-us/Intersectionality-p-9780745684499

Connell, R. (2011). Southern Bodies and Disability: re-thinking concepts. *Third World Quarterly*, *32*(8), 1369–1381. https://doi.org/10.1080/01436597.2011.614799

Costanza-Chock, S. (2018a). *Design Justice, A.I., and Escape from the Matrix of Domination*. https://doi.org/10.21428/96c8d426

Costanza-Chock, S. (2018b). Design Justice: Towards an Intersectional Feminist Framework for Design Theory and Practice. *Costanza-Chock, Sasha, Design Justice: Towards an*

Intersectional Feminist Framework for Design Theory and Pract Proceedings of the

Design Research Society 2018. Retrieved from

https://papers.ssrn.com/abstract=3189696

Crenshaw, K. (1991). Mapping the Margins: Intersectionality, Identity Politics, and Violence

Against Women of Color. *Stanford Law Review*, *43*, 1241–1299.

https://doi.org/10.2307/1229039

Denzin, N. K., & Lincoln, Y. S. (2011). Ethics and Politics in Qualitative Research. In *The SAGE*

Handbook of Qualitative Research (4th ed.). SAGE.

Dix, A., Finlay, J., Abowd, G. D., & Beale, R. (2004). 14 Communication and collaboration

models. In *Human-computer interaction* (3rd ed, pp. 475–494). Harlow, England ;

New York: Pearson/Prentice-Hall.

Eika, F. (2011a). Funksjonsnedsettelse og funksjonshemning. In *Universell utforming av IKT-*

systemer (pp. 24–26). Oslo: Universitetsforlaget.

Eika, F. (2011b). Tilgjengelighet. In *Universell utforming av IKT-systemer* (p. 27). Oslo:

Universitetsforlaget.

Eika, F. (2011c). Universell Utforming. In *Universell utforming av IKT-systemer* (pp. 28–29).

Oslo: Universitetsforlaget.

Felmlee, D., Rodis, P. I., & Francisco, S. C. (2018). What a B!tch!: Cyber Aggression Toward

Women of Color. In M. T. Segal & V. P. Demos (Eds.), *Gender and the Media: Women's*

Places (pp. 105–123)

Fernandes, L. (2013). *Transnational feminism in the United States: knowledge, ethics, and*

power. New York: New York University Press.

Ford, H., & Wajcman, J. (2017). 'Anyone can edit', not everyone does: Wikipedia's infrastructure and the gender gap. *Social Studies of Science*, *47*(4), 511–527. https://doi.org/10.1177/0306312717692172

Frauenberger, C. (2015). Disability and Technology: A Critical Realist Perspective. *Proceedings of the 17th International ACM SIGACCESS Conference on Computers & Accessibility*, 89–96. https://doi.org/10.1145/2700648.2809851

Friedman, B., & Nissenbaum, H. (1996). Bias in Computer Systems. *ACM Trans. Inf. Syst.*, *14*(3), 330–347. https://doi.org/10.1145/230538.230561

Fuchs, C., & Obrist, M. (2010). HCI and Society: Towards a Typology of Universal Design Principles. *International Journal of Human–Computer Interaction*, *26*(6), 638–656. https://doi.org/10.1080/10447311003781334

Fuglerud, K. S. (2009). Universal Design in ICT services. In T. Vavik (Ed.), *Inclusive Buildings, Products & Services: Challenges in Universal Design* (pp. 245–291). Tapir Academic Press.

Garland-Thomson, R. (2011). Misfits: A Feminist Materialist Disability Concept. *Hypatia*, *26*(3), 591–609. https://doi.org/10.1111/j.1527-2001.2011.01206.x

Gauthier, M., & Sawchuk, K. (2017). Not notable enough: feminism and expertise in Wikipedia. *Communication and Critical/Cultural Studies*, *14*(4), 385–402. https://doi.org/10.1080/14791420.2017.1386321

Giannoumis, G. A., & Skjerve, R. A. (2020). Intersectional Accessibility: examining the overlapping barriers that persons experience at the juncture of multiple forms of social disadvantage. In J. Lazar & M. Stein (Eds.), *Accessible Technology and the*

Developing World. Oxford: Oxford University Press.

Giannoumis, G. A., & Stein, M. (2019). Conceptualizing Universal Design for the Information Society through a Universal Human Rights Lens. *International Human Rights Law Review*.

Gibson, B. E. (2014). Parallels and problems of normalization in rehabilitation and universal design: enabling connectivities. *Disability and Rehabilitation*, *36*(16), 1328–1333. https://doi.org/10.3109/09638288.2014.891661

Graham, L. J., & Slee, R. (2008). An Illusory Interiority: Interrogating the discourse/s of inclusion. *Educational Philosophy and Theory*, *40*(2), 277–293. https://doi.org/10.1111/j.1469-5812.2007.00331.x

Grue, J. (2010). Is there something wrong with society, or is it just me? Social and medical knowledge in a Norwegian anti-discrimination law. *Scandinavian Journal of Disability Research*, *12*(3), 165–178. https://doi.org/10.1080/15017410903338853

Grue, J. (2016). The problem with inspiration porn: a tentative definition and a provisional critique. *Disability & Society*, *31*(6), 838–849. https://doi.org/10.1080/09687599.2016.1205473

Hadley, B. (2016). Cheats, charity cases and inspirations: disrupting the circulation of disability-based memes online. *Disability & Society*, *31*(5), 676–692. https://doi.org/10.1080/09687599.2016.1199378

Hamraie, A. (2013). Designing Collective Access: A Feminist Disability Theory of Universal Design. *Disability Studies Quarterly*, *33*(4). Retrieved from http://dsq-sds.org/article/view/3871/3411

Hamraie, A. (2015). Inclusive Design: Cultivating Accountability toward the Intersections of Race, Aging, and Disability. *Age Culture Humanities*, (2), 6.

Hamraie, A. (2016). Universal Design and the Problem of "Post-Disability" Ideology. *Design and Culture*, *8*(3), 285–309. https://doi.org/10.1080/17547075.2016.1218714

Holton, J. A. (2011). The Coding Process and Its Challenges. In *The Sage Handbook of Grounded Theory* (pp. 266–289). SAGE.

Huang, Z., & Yuan, L. (2017). Gender Differences in Tourism Website Usability: An Empirical Study. In A. Marcus & W. Wang (Eds.), *Design, User Experience, and Usability: Understanding Users and Contexts* (pp. 453–461). Springer International Publishing.

Hughes, B., & Paterson, K. (1997). The Social Model of Disability and the Disappearing Body: Towards a sociology of impairment. *Disability & Society*, *12*(3), 325–340. https://doi.org/10.1080/09687599727209

Iivari, N., Kinnula, M., & Kuure, L. (2015). With best intentions: A Foucauldian examination on children's genuine participation in ICT design. *Information Technology & People*, *28*(2), 246–280. https://doi.org/10.1108/ITP-12-2013-0223

Imrie, R. (2012). Universalism, universal design and equitable access to the built environment. *Disability and Rehabilitation*, *34*(10), 873–882. https://doi.org/10.3109/09638288.2011.624250

International Organization for Standardization. (2010). 2.13 usability. In *ISO 9241-210:2010(en)*. Retrieved from https://www.iso.org/obp/ui/#iso:std:iso:9241:-210:ed-1:v1:en

Introna, L. D., & Nissenbaum, H. (2000). Shaping the Web: Why the Politics of Search Engines

Matters. *The Information Society*, *16*(3), 169–185.

https://doi.org/10.1080/01972240050133634

Irani, L., Vertesi, J., Dourish, P., Philip, K., & Grinter, R. E. (2010). Postcolonial Computing: A

Lens on Design and Development. *Proceedings of the SIGCHI Conference on Human*

Factors in Computing Systems, 1311–1320.

https://doi.org/10.1145/1753326.1753522

Johnson, R. B., & Walsh, I. (2019). Mixed Grounded Theory: Merging Grounded Theory with

Mixed Methods and Multimethod Research. In Antony Bryant & K. Charmaz, *The*

SAGE Handbook of Current Developments in Grounded Theory (pp. 517–531).

https://doi.org/10.4135/9781526485656.n27

Johnstone, D. (2005). Why Study Disability? Some explanatory beginings. In *Cross-Phase*. *An*

introduction to disability studies (2nd ed., reprint). Abingdon: Fulton.

Kafai, Y. B., Richard, G. T., & Tynes, B. M. (2017). *Diversifying Barbie and Mortal Kombat:*

Intersectional Perspectives and Inclusive Designs in Gaming. Lulu.com.

Kaiser, K. (2009). Protecting Respondent Confidentiality in Qualitative Research. *Qualitative*

Health Research, *19*(11), 1632–1641. https://doi.org/10.1177/1049732309350879

Karapapa, S., & Borghi, M. (2015). Search engine liability for autocomplete suggestions:

personality, privacy and the power of the algorithm. *International Journal of Law and*

Information Technology, *23*(3), 261–289. https://doi.org/10.1093/ijlit/eav009

Kelly, B., Sloan, D., Brown, S., Seale, J., Lauke, P., Ball, S., & Smith, S. (2009). Accessibility 2.0:

Next Steps for Web Accessibility. *Journal of Access Services*, *6*(1–2), 265–294.

https://doi.org/10.1080/15367960802301028

Keyes, O., Hoy, J., & Drouhard, M. (2019). Human-Computer Insurrection: Notes on an

Anarchist HCI. *Proceedings of the 2019 CHI Conference on Human Factors in*

Computing Systems, 339:1–339:13. https://doi.org/10.1145/3290605.3300569

Lazar, J., Feng, J. H., & Hochheiser, H. (2010a). Interviews. In *Research Methods in Human-*

Computer Interaction (pp. 187–226). Chichester, West Sussex, U.K: Wiley.

Lazar, J., Feng, J. H., & Hochheiser, H. (2010b). Working with human subjects. In *Research*

Methods in Human-Computer Interaction. Chichester, West Sussex, U.K: Wiley.

Lecher, C. (2018, March 21). A healthcare algorithm started cutting care, and no one knew

why. Retrieved from The Verge website:

https://www.theverge.com/2018/3/21/17144260/healthcare-medicaid-algorithm-

arkansas-cerebral-palsy

Lempert, L. B. (2011). Asking questions of the Data: Memo Writing in the Grounded Theory

Tradition. In *The Sage Handbook of Grounded Theory* (pp. 245–264). SAGE.

Lid, I. M. (2013). Developing the theoretical content in Universal Design. *Scandinavian*

Journal of Disability Research, *15*(3), 203–215.

https://doi.org/10.1080/15017419.2012.724445

Lin, C. J., & Hsieh, T.-L. (2016). Exploring the design criteria of website interfaces for gender.

International Journal of Industrial Ergonomics, *53*, 306–311.

https://doi.org/10.1016/j.ergon.2016.02.002

Loja, E., Costa, M. E., Hughes, B., & Menezes, I. (2013). Disability, embodiment and ableism:

stories of resistance. *Disability & Society*, *28*(2), 190–203.

https://doi.org/10.1080/09687599.2012.705057

Mace, R., Connell, B. R., Jones, M., Mueller, J., Mullick, A., Ostroff, E., … Vanderheim, G.

    (1997). The Center for Universal Design - Universal Design Principles. Retrieved from

    The principles of Universal Design website:

    https://projects.ncsu.edu/ncsu/design/cud/about_ud/udprinciplestext.htm

Markussen, R. (1996). Politics of intervention in design: Feminist reflections on the

    Scandinavian tradition. *AI & SOCIETY*, *10*(2), 127–141.

    https://doi.org/10.1007/BF01205278

Marsden, N., & Haag, M. (2016). Evaluation of GenderMag Personas Based on Persona

    Attributes and Persona Gender. In C. Stephanidis (Ed.), *HCI International 2016 –*

    Posters' Extended Abstracts (pp. 122–127). Springer International Publishing.

Marshall, R., Cook, S., Mitchell, V., Summerskill, S., Haines, V., Maguire, M., … Case, K. (2015).

    Design and evaluation: End users, user datasets and personas. *Applied Ergonomics*,

    46, 311–317. https://doi.org/10.1016/j.apergo.2013.03.008

McIlwain, C. (2017). Racial formation, inequality and the political economy of web traffic.

    Information, Communication & Society, *20*(7), 1073–1089.

    https://doi.org/10.1080/1369118X.2016.1206137

McRuer, R. (2016). Compulsory Able-Bodiedness and Queer Disabled Existence. In L. J. Davis

    (Ed.), *The Disability Studies Reader* (5th ed., pp. 396–405). New York, NY: Taylor &

    Francis.

Meekosha, H. (2011). Decolonising disability: thinking and acting globally. *Disability &*

    Society, *26*(6), 667–682. https://doi.org/10.1080/09687599.2011.602860

Meekosha, H., & Shuttleworth, R. (2009). What's so 'critical' about critical disability studies?

Australian Journal of Human Rights, *15*(1), 47–75.

https://doi.org/10.1080/1323238X.2009.11910861

Meer, T., & Combrinck, H. (2015). Invisible intersections: Understanding the complex

stigmatisation of women with intellectual disabilities in their vulnerability to gender-

based violence: *Agenda*, *29*(2). https://doi.org/10.1080/10130950.2015.1039307

Merriam-Webster. (n.d.). Definition of CISGENDER. Retrieved from https://www.merriam-

webster.com/dictionary/cisgender

Miaskiewicz, T., & Kozar, K. A. (2011). Personas and user-centered design: How can personas

benefit product design processes? *Design Studies*, *32*(5), 417–430.

https://doi.org/10.1016/j.destud.2011.03.003

Miller, B., & Record, I. (2017). Responsible epistemic technologies: A social-epistemological

analysis of autocompleted web search. *New Media & Society*, *19*(12), 1945–1963.

https://doi.org/10.1177/1461444816644805

Moodley, J. (2019). The Significance of Intersectionality in Mental Health-Care Policy in South

Africa. In O. Hankivsky & J. S. Jordan-Zachery (Eds.), *The Palgrave Handbook of*

Intersectionality in Public Policy (pp. 625–640). https://doi.org/10.1007/978-3-319-

98473-5_29

Moodley, J., & Graham, L. (2015a). The importance of intersectionality in disability and

gender studies. *Agenda*, *29*(2), 24–33.

https://doi.org/10.1080/10130950.2015.1041802

Moodley, J., & Graham, L. (2015b). The importance of intersectionality in disability and

gender studies. *Agenda*, *29*(2), 24–33.

https://doi.org/10.1080/10130950.2015.1041802

Nguyen, X.-T., & Mitchell, C. (2014). Inclusion in Vietnam: An intersectionality perspective on girls with disabilities and education. *Childhood*, *21*(3), 324–338. https://doi.org/10.1177/0907568214524459

Norwegian Directorate for Children, Youth and Family Affairs, The Delta Centre. (2013). *Trends in Universal Design*. Retrieved from https://www.bufdir.no/Global/nbbf/universell_utforming/Trends_in_Universal_Design.PDF

NSD. (2018). Sårbare grupper. Retrieved from https://nsd.no/personvernombud/hjelp/forskningstema/saarbare_grupper.html

Oliver, M., & Barnes, C. (2012). *The New Politics of Disablement* (second). New York: Palgrave MacMillian.

Olson, K. E., O'Brien, M. A., Rogers, W. A., & Charness, N. (2011). Diffusion of Technology: Frequency of Use for Younger and Older Adults. *Ageing International*, *36*(1), 123–145. https://doi.org/10.1007/s12126-010-9077-9

Orzeszek, D., Kopec, W., Wichrowski, M., Nielek, R., Balcerzak, B., Kowalik, G., & Puchalska-Kaminska, M. (2017). Beyond Participatory Design: Towards a Model for Teaching Seniors Application Design. arXiv preprint arXiv:1707.05667.

OsloMet. (n.d.). Security instructions. Retrieved from https://ansatt.oslomet.no/en/security-instructions

Oyibo, K., & Vassileva, J. (2017). The Interplay of Aesthetics, Usability and Credibility in Mobile Website Design and the Effect of Gender. *SBC Journal on Interactive Systems*,

8(2), 4–19.

Parvin, N. (2019). Look Up and Smile! Seeing through Alexa's Algorithmic Gaze. *Catalyst:*

Feminism, Theory, Technoscience, *5*(1), 1–11.

https://doi.org/10.28968/cftt.v5i1.29592

Peine, A., Faulkner, A., Jæger, B., & Moors, E. (2015). Science, technology and the 'grand

challenge' of ageing—Understanding the socio-material constitution of later life.

Technological Forecasting and Social Change, *93*, 1–9.

https://doi.org/10.1016/j.techfore.2014.11.010

Persson, H., Åhman, H., Yngling, A. A., & Gulliksen, J. (2015). Universal design, inclusive

design, accessible design, design for all: different concepts—one goal? On the

concept of accessibility—historical, methodological and philosophical aspects.

Universal Access in the Information Society, *14*(4), 505–526.

https://doi.org/10.1007/s10209-014-0358-z

Rogers, Y. (2012). HCI Theory: Classical, Modern, and Contemporary. *Synthesis Lectures on*

Human-Centered Informatics, *5*(2), 1–129.

https://doi.org/10.2200/S00418ED1V01Y201205HCI014

Sarkar, U., Gourley, G. I., Lyles, C. R., Tieu, L., Clarity, C., Newmark, L., … Bates, D. W. (2016).

Usability of Commercially Available Mobile Applications for Diverse Patients. *Journal*

of General Internal Medicine, *31*(12), 1417–1426. https://doi.org/10.1007/s11606-

016-3771-6

Schiek, D., & Lawson, A. (Eds.). (2011). *European Union non-discrimination law and*

intersectionality: investigating the triangle of racial, gender and disability

discrimination. Burlington, VT: Ashgate Pub.

Shakespeare, T. (2016). Just What Is the Disability Perspective on Disability? *Hastings Center Report*, *46*(3), 31–32. https://doi.org/10.1002/hast.587

Shaw, A., & Hargittai, E. (2018). The Pipeline of Online Participation Inequalities: The Case of Wikipedia Editing. *Journal of Communication*, *68*(1), 143–168. https://doi.org/10.1093/joc/jqx003

Skjerve, R., Giannoumis, G. A., & Naseem, S. (2016). An Intersectional Perspective on Web Accessibility. In *Designing Around People* (pp. 13–22). Springer, Cham

Sonderegger, A., Schmutz, S., & Sauer, J. (2016). The influence of age in usability testing. *Applied Ergonomics*, *52*, 291–300. https://doi.org/10.1016/j.apergo.2015.06.012

Sultana, S., & Ahmed, S. I. (2019). Witchcraft and HCI: Morality, Modernity, and Postcolonial Computing in Rural Bangladesh. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*, 356:1–356:15. https://doi.org/10.1145/3290605.3300586

Trischler, J., Pervan, S. J., Kelly, S. J., & Scott, D. R. (2018). The Value of Codesign: The Effect of Customer Involvement in Service Design Teams. *Journal of Service Research*, *21*(1), 75–100. https://doi.org/10.1177/1094670517714060

Turner, P., & Turner, S. (2011). Is stereotyping inevitable when designing with personas? *Design Studies*, *32*(1), 30–44. https://doi.org/10.1016/j.destud.2010.06.002

Umbrello, S. (2018). The moral psychology of value sensitive design: the methodological issues of moral intuitions for responsible innovation. *Journal of Responsible Innovation*, *5*(2), 186–200. https://doi.org/10.1080/23299460.2018.1457401

UN. (2006a). *Article 3 - General Principles. Convention on the Rights of Persons with*

Disabilities. Retrieved from

https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-

persons-with-disabilities/article-3-general-principles.html

UN. (2006b). *Article 9 - Accessibility*. Retrieved from

https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-

persons-with-disabilities/article-9-accessibility.html

UN Department of Economics and Social Affairs. (2017). *World population ageing, 2017*

highlights. Retrieved from

https://www.un.org/en/development/desa/population/publications/pdf/ageing/WP

A2017_Highlights.pdf

W3C WAI. (2019, April 25). Web Accessibility Laws & Policies. Retrieved from Web

Accessibility Initiative (WAI) website: https://www.w3.org/WAI/policies/

Wagner, N., Hassanein, K., & Head, M. (2014). The impact of age on website usability.

Computers in Human Behavior, *37*, 270–282.

https://doi.org/10.1016/j.chb.2014.05.003

Wilkerson, A. (2015). Embodiement. In R. Adams, R. Benjamin, & D. Serlin (Eds.), *Keywords*

for Disability Studies (pp. 67–70).

Winance, M. (2014). Universal design and the challenge of diversity: reflections on the

principles of UD, based on empirical research of people's mobility. *Disability and*

Rehabilitation, *36*(16), 1334–1343. https://doi.org/10.3109/09638288.2014.936564

Winschiers-Theophilus, H., & Bidwell, N. J. (2013). Toward an Afro-Centric Indigenous HCI

Paradigm. *International Journal of Human–Computer Interaction*, *29*(4), 243–255.

https://doi.org/10.1080/10447318.2013.765763

World Health Organization. (2011). *World Report on Disability*. Retrieved from

https://www.unicef.org/protection/World_report_on_disability_eng.pdf

Appendix A: Grounded theory codes

A i) Cost Barriers

- Cost of equipment
  - Class discrimination
    - Not affording equipment
    - Having to share equipment
    - Not affording adequate equipment
      - Ableism
        - Being perceived as entitled (particularly connected to Not affording adequate equipment)
- Cost of use
  - Direct connections
    - Class discrimination
      - Not affording expensive licensing
  - Intermediary tier
    - Technology not available in (first)language
      - Ableism and racism
        - Having to learn new language
      - Class discrimination
        - Having to pay for language classes
    - Being expected to "show up"
      - Ableism
        - Being perceived as lazy
      - Sexism
        - Having to use unsafe transportations
      - Class discrimination
        - Not affording transportation

A ii) Confidence

- Un-/Familiarity
  - Being comfortable with familiar technology
    - Familiar technology as "invisible" part of life
    - Practical arrangements and troubleshooting of technology
    - Issues with new iteration of familiar technology
  - Being hesitant towards unfamiliar technologies
    - Experiencing issues with adaptation of unfamiliar technology
    - Fear of "messing up"
- Encouragement

- o Being encouraged through participation
- o Being encouraged to further opportunities
- o Family prioritizing access to technology for children

A iii)Self perception

- Perception of an inherent non-understanding
  - o Age
    - Encountering design adapted to a "younger" cognitive model
  - o Race
    - Encountering technology not available in (first)language
    - Encountering a white/"western" cognitive model in design
- Perception of technology as "male"
  - o Growing up with technology as male domain(connects to Perception of an inherent non-understanding)
  - o Having men as technology "experts" in relationships
    - Role in relationship not allowing for time to learn technology (connects to feeling of lagging behind)
- Feeling of lagging behind
  - o Class
    - Not being able to afford new equipment
  - o Disability
    - Loss of confidence in learning
  - o Age
    - Feeling that younger generations are better at technology

A iiii)Online apprehension

- Being controlled
  - o "Bubbles"
  - o Privacy
- Staying safe
  - o Negotiating identity
    - Considering which identity to comment as
    - Minimizing expressions of identity
  - o Limiting participation
    - Considering potential reactions
    - Considering context
- Experiencing hostility
  - o Being harassed

- Being ridiculed
- Being dismissed
- Observing hostility towards others
- Emotional work
  - Protecting other oppressed groups
  - Protecting other persons with same identity
  - Limiting posting to what would benefit other people