

Systemic Sensitivity

On Systemic Oppression in
Socio-Technical Systems

Linnea Öhlund



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Academic dissertation

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Abstract

As technology becomes an integral part of everyday life for many, it also becomes a tool to facilitate harm and injustice towards communities who face marginalization.

To understand and address challenges of systemic oppression, the field of human–computer interaction (HCI) has moved towards framing larger questions of injustice and systemic issues. Through the growing area of social justice in HCI, researchers are collectively working to frame more just futures for communities that have experienced marginalization.

However, the influence of systemic oppression on socio-technical systems can create hard-to-predict outcomes that ultimately lead to reproducing harmful practices towards marginalized communities. Through the included papers in this dissertation, on a range of topics from cultural heritage for Sámi communities, ageism reproduced through technology implementation, socio-political awareness to mitigate technology-facilitated sex trafficking, supporting women with experience of sexual violence to paths of justice, building a cohesive and fluid understanding of social justice in HCI, and critiquing interpersonal safety technologies, I present and discuss how the influence of systemic oppression creates hard-to-predict outcomes in the socio-technical systems we create. I show how these outcomes can lead to reproducing harmful practices towards marginalized communities and why it is important to actively work against this. To address the outcomes and harmful practices that I refer to as the “harm-reproduction loop,” I propose a theoretical lens called systemic sensitivity.

Systemic sensitivity is a lens to support researchers in understanding the loop, addressing hard-to-predict outcomes and mitigating harmful practices. In doing so, we can more actively work against systemic oppression and work towards socio-political change and long-term contributions towards marginalized communities.

This dissertation is a compilation dissertation, which means it is based on six papers in total.

These papers are the foundation of the work produced, and all have been conducted within social justice in HCI.

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*Se bju ein faltje, b  gammel a ong
Ber tt n' histori, a prata a sjong
Wavel, a divel, a remist r
Var nalta hev a g r se hon lev
- Barbro Lindgren, Om taka a kulturn, 2006
(skellefte bondska)*

*Till min Farmor Karin  hlund (1934–2022)
och min Farfar Rune  hlund (1925–2020)
Ni finns inte i den h r v rlden l ngre
men ni finns alltid hos mig*



UMEÅ UNIVERSITET

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Abstract

As technology becomes an integral part of everyday life for many, it also becomes a tool to facilitate harm and injustice towards communities who face marginalization.

To understand and address challenges of systemic oppression, the field of human–computer interaction (HCI) has moved towards framing larger questions of injustice and systemic issues. Through the growing area of social justice in HCI, researchers are collectively working to frame more just futures for communities that have experienced marginalization.

However, the influence of systemic oppression on socio-technical systems can create hard-to-predict outcomes that ultimately lead to reproducing harmful practices towards marginalized communities.

Through the included papers in this dissertation, on a range of topics from cultural heritage for Sámi communities, ageism reproduced through technology implementation, socio-political awareness to mitigate technology-facilitated sex trafficking, supporting women with experience of sexual violence to paths of justice, building a cohesive and fluid understanding of social justice in HCI, and critiquing interpersonal safety technologies, I present and discuss how the influence of systemic oppression creates hard-to-predict outcomes in the socio-technical systems we create. I show how these outcomes can lead to reproducing harmful practices towards marginalized communities and why it is important to actively work against this.

To address the outcomes and harmful practices that I refer to as the “harm-reproduction loop,” I propose a theoretical lens called systemic sensitivity. Systemic sensitivity is a lens to support researchers in understanding the loop, addressing hard-to-predict outcomes and mitigating harmful practices. In doing so, we can more actively work against systemic oppression and work towards socio-political change and long-term contributions towards marginalized communities.

This dissertation is a compilation dissertation, which means it is based on six papers in total. These papers are the foundation of the work produced, and all have been conducted within social justice in HCI.

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I firstly want to make a confession: Since I first started writing this dissertation, I have many times imagined what I would write in the acknowledgements. How do I begin to thank the many people that made this dissertation possible? It might be my name on the front, but many individuals have contributed immensely.

Undoubtedly, the many individuals who have participated in my various studies and papers have made a great contribution not only to my personal work and dissertation but to HCI as a whole. Without their knowledge, opinions and perspectives, this dissertation and its work in mitigating harmful practices could not have been possible.

Two of the main pillars of my PhD has been my supervisors Mikael Wiberg and Rikard Harr.

Thank you, Mikael, for your curiosity and positivity and for sharing your widespread knowledge. You have always had a genuine interest in my work, which has been so important in the ups and downs of being a PhD student. It is really one of the biggest reasons I have been so successful in my work so far (sorry for bragging). Truly, thank you! Without you it would not have been possible.

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Finally, to my fiancé Axel (and our cat Alfons). The life we have is more than I ever dreamed of, love you!

- April 6th, 2025, a very early spring day.

Enkel sammanfattning på svenska

Allteftersom teknologi blir en större del av människors liv kan det även bli ett allt större verktyg för systemiskt förtryck av marginaliserade grupper.

För att förstå och adressera detta har området Människa-datorinteraktion (HCI) börjat centrera frågor om orättvisa och systemiska utmaningar. Genom det växande området "Social Justice" inom HCI, arbetar forskare tillsammans med grupper och individer som upplevt marginalisering för att främja en rättvisare framtid.

Men inflytandet som systemiskt förtryck har på socio-tekniska system kan skapa oförutsägbara resultat som i slutändan leder till att skadliga praktiker reproduceras gentemot marginaliserade grupper. Utan att vara känslig inför dessa resultat och skadliga praktiker kan forskare, trots motsatt avsikt, bidra till systemiskt förtryck.

Genom artiklarna som ingår i denna avhandling presenterar och diskuterar jag hur inflytandet av systemiskt förtryck skapar svårförutsägbara utfall inom de sociotekniska system vi skapar. Jag visar hur dessa resultat kan leda till att reproducera skadliga metoder gentemot marginaliserade grupper och varför det är viktigt att aktivt motarbeta detta.

Grunden till avhandlingens bidrag kommer från 6 artiklar som handlar om allt från tillgång till kulturellt arv för samiska grupper, ålderism som reproduceras via teknologisk implementering, vikten av socio-politisk medvetenhet för att minska teknologiskt-faciliterad sextrafficking, digitalt stöd för kvinnor som upplevt sexuella övergrepp, hur man främjar en sammanhållen förståelse för Social Justice inom HCI, till att kritisera personlig säkerhetsteknologi.

Avhandlingens bidrag stöttar HCI forskare att förstå och adressera systemiskt förtryck samt främjar positiv socio-politisk förändring gentemot marginaliserade grupper på lång sikt.

Chapter 1 – Introduction

As technology becomes an integral part of everyday life for many, it also becomes a tool to facilitate systemic oppression towards communities who face marginalization. While socio-technical systems offer many positive opportunities for marginalized communities, they are also able to facilitate further ways of harm and injustice. To address these challenges, many HCI researchers have turned to topics on injustice and systemic issues to enact positive change (Bellini et al., 2019, 2022; Erete et al., 2021; Ogbonnaya-Ogburu et al., 2020; Rabaan, 2021; Strohmayer et al., 2017; Sultana et al., 2018). While researchers develop, design and create with the best of intentions, the complex and abstract nature of systemic oppression causes hard-to-predict outcomes on socio-technical systems in marginalized communities.

In the field of human–computer interaction (HCI), there is a growing interest centering systemic oppression, and the potential digital technology holds in aspects of change and intervention. Over the last 15 years, HCI has moved further towards addressing various questions on systemic oppression, structural and individual injustice, marginalization, discrimination, inequity and unfairness (Bellini et al., 2022; Corbett & Loukissas, 2019; Dombrowski et al., 2016; Fox et al., 2017; Pendse et al., 2021; Strohmayer et al., 2019a; Sultana et al., 2018). Taken together, these conversations are often discussed in HCI as an area called social justice.

Working within social justice means bringing in a larger scope of socio-political thought than in other research paradigms. In the “harder sciences,” politics, personal values and beliefs are to be strictly separated from research. However, in HCI, researchers have to a larger extent began to realize how the notion of “neutrality” is not possible and could even be directly harmful when working with systemic oppression as experienced by marginalized communities (Bellini et al., 2022; Strohmayer et al., 2019a; Sultana et al., 2018).

Moreover, some HCI researchers argue that we have come too far as a research community to not collectively address systemic oppression and socio-political change, as we know that the socio-technical systems we research, develop, design and engage with carry great power (Bellini et al., 2022; Dombrowski et al., 2016; L. Irani et al., 2010; Sharma, Kumar, et al., 2023).

HCI researchers have for many years collectively worked to recognize the many complexities and nuances of systemic oppression by, for example, discussing how HCI can resist and counter forced spatial displacement (Corbett & Loukissas, 2019), support misrepresented communities (Strohmayr et al., 2017, 2019a) and assist in relieving victims of sexual abuse of heightened stigma (Sultana et al., 2022). This interest can also be seen in publications centering on the difficulties of designing for patriarchal societies (Sultana et al., 2018, 2022), the prevalence of racism within the social-computing field (Erete et al., 2021, 2023; Ogbonnaya-Ogburu et al., 2020) and the complexity of addressing “wicked problems” characterized by their complexity, scale and lack of solution (Dombrowski et al., 2016; Sharma, Kumar, et al., 2023).

While interest has grown in HCI to center on injustice towards marginalized communities, some argue that the complex and abstract nature of systemic oppression demands certain sensitivities.

For example, Sultana et al. (2018) echo the importance of being sensitive to the complex colonial history of the Global South so as to not reproduce and cement harmful values and ideas when conducting research in that context. Moreover, while conducting research in HCI on topics of injustice, we must be sensitive to our own power and privilege so as to not assume that we can never be part of systemic oppression, as expressed by Erete et al. (2021) and Corbett & Loukissas (2019). Lastly, as discussed by Bellini (2023), financial abuse through digital systems is a common part of intimate partner abuse – issues with roots in gendered violence. Being sensitive to this knowledge on how financial socio-technical systems can be misused is an important part of not creating pathways for gendered violence.

As much attention in HCI has catered to nuanced perspectives of injustice towards marginalized communities, more research is needed on how to be sensitive to the complex and abstract nature of systemic oppression.

To address this gap, the overall aim of this dissertation is to support HCI researchers to understand and address the influence of systemic oppression on socio-technical systems towards marginalized communities. I argue that by understanding that systemic oppression causes hard-to-predict outcomes on socio-technical systems in marginalized communities, HCI researchers can better mitigate and stifle harmful practices. To address this, I propose *systemic sensitivity*, a

theoretical lens that is meant to open up for greater opportunities of socio-political change and long-term contributions towards marginalized communities we support and are sometimes part of. Without adopting the lens, HCI researchers risk reproducing and cementing harmful and unjust practices towards marginalized communities despite good intentions.

I pose a research question so as to highlight and discuss the large, complex and abstract nature of systemic oppression and the hard-to-predict outcomes it can have on socio-technical systems for marginalized communities:

- How can HCI researchers understand and address systemic oppression in socio-technical systems?

This question is asked as a way to better understand hard-to-predict-outcomes and not reproduce harmful practices against marginalized communities. The research question also asks how HCI researchers can address systemic oppression in socio-technical systems so as to actively work against it. Answering this question is important in regard to the growing area of social justice in HCI, which deals with justice and injustice towards marginalized communities on a larger scale. To make long-term contributions towards socio-political change supported by socio-technical systems, we need to be more sensitive to how the systems we create can reproduce harm. This is moreover important as HCI moves towards a larger scope of socio-political change because it means we turn to larger and more long-term contributions.

Limitations

In this dissertation, I work with communities who have faced marginalization. The results and contributions of each paper are limited to that particular community.

All of the empirical data in this dissertation is of a qualitative nature, in line with much social justice HCI literature. Hence, no quantitative collections have been conducted.

While many critical theories could have been used in this dissertation, the work is conducted within social justice HCI as a critical area focused on injustice and systemic issues.

This dissertation centers on people’s lived experiences. This means that subjective opinions and perspectives are taken and treated as participants’ own truths. As this dissertation discusses in much detail, when working with questions of injustice and individuals who have experiences of systemic oppression, “objective truths” are often rejected.

Ethical considerations

Working within social justice in HCI means inherently working with and reflecting on ethical dilemmas. Each study and paper of this dissertation has followed proper ethical considerations, which have included, for example, participants receiving information on the study, writing letters of consent and the possibility to withdraw participation. Participants have also been offered the opportunity to read their transcripts. These ethical considerations are in line with the Swedish Research Council’s four principles for good research conduct (Vetenskapsrådet, 2024).

Two studies have been approved by the Swedish Ethical Review Authority because they included asking individuals about experiences that are deemed to be of a particularly sensitive nature according to the European Commission (European Commission, 2025). These are Papers 1 and 4.

Each paper has also been built on earlier HCI literature that specifically discusses sensitivities when conducting research with communities who have faced marginalization (see, for example, Dombrowski et al., 2016; Strohmayer et al., 2019a).

Summary of main contributions

Through the research I have conducted during the last four years, three main contributions can be articulated towards the HCI field and community.

Systemic sensitivity – A theoretical lens to mitigate harmful practices: The main contribution of this dissertation is the theoretical lens systemic sensitivity and the harm-reproduction loop model. I propose the lens to support HCI researchers in addressing hard-to-predict outcomes of systemic oppression’s influence on socio-technical systems

and as a way to mitigate harmful practices towards marginalized communities.

Empirical papers showing real-world relevance: Through the empirical papers included in this dissertation, I contribute to nuanced perspectives on how socio-technical systems can facilitate harmful practices and systemic oppression in the real world. While some research positions technology to solve injustice, my work shows that we must work actively so as to not contribute to systemic oppression.

A gathered collection of social justice work in HCI: The background and theoretical framing of this thesis is one of the larger collections of social justice HCI literature to this day. Each empirical paper – P1, P2, P3, P4 and P6 – showcases various nuances of how to work within social justice. Together with the fifth paper, P5, this dissertation showcases the beginning, current status and collective movement forward within the social justice discourse in HCI.

Summary of studies and papers included in thesis

In this section, I will provide a brief overview of the papers included in this thesis through the study it was part of, the authors of the paper and the status of publication. Adjacent to each table follows a description of my individual contributions to each study and paper.

Study no. 1	Digital Access to Sámi Cultural Heritage
Paper no. 1	Designing a Digital Archive for Indigenous People
Authors	Fatemeh Moradi, Linnea Öhlund, Mikael Wiberg, Hanna Nordin
Status	Published as a full conference paper at NordiCHI 2020

My contributions: In this paper, I was part of a team working specifically with the evaluation and UX design of a digital archive for Sámi cultural heritage. Fatemeh Moradi and I held brainstorming sessions together with other team members in developing a prototype for the Umeå component of the project. Moreover, I also conducted interviews and a design walkthrough with 12 individuals from different backgrounds together with Fatemeh. From the data collection, we both analyzed and

summarized the data and reported on it in the paper written together with Hanna Nordin and Mikael Wiberg. Following this paper, I was in charge of reporting our results to our larger project group at a conference in Inari, Finland in 2020, while also presenting the published paper at the NordiCHI 2020 conference.

Study no. 2	Exploring Seniors' Technology Use During COVID-19
Paper no. 2	A Social Justice-Oriented Perspective on Older Adults' Technology Use in HCI
Authors	Linnea Öhlund
Status	Published as a full conference paper at the HCII conference in 2023

My contributions: The topic for this study was decided on together with my supervisors Mikael Wiberg and Rikard Harr but subsequently I was responsible for the majority of all parts. To start collecting data, I sought out older adults living in Umeå to interview them about their technology habits during COVID-19. I recruited them through an online senior citizen organization and snowball sampling. I conducted 15 interviews and the following thematic analysis. I wrote the paper myself. However, during the analysis, my supervisors assisted me on how to move forward with my rich material and gave many iterations of feedback on the text, which helped in its later publication.

Study no. 3	Preventing Technology-Facilitated Sex Trafficking
Paper no. 3	Mapping the Digital Injustices of Technology-Facilitated Sex Trafficking
Authors	Linnea Öhlund, Teresa Almeida
Status	Published as a short conference paper at Interact 2023

My contributions: Together with Teresa Almeida, I decided on the direction of the study focusing on technology-facilitated sex trafficking.

To collect data, I was in charge of finding suitable representatives with knowledge that would be valuable to our study. After recruitment, I interviewed the six participants, transcribed and translated all data to English. We divided the transcriptions between us and separately conducted a thematic analysis. After this step, we met and compared our results to define themes for the paper. We wrote the paper together. For the publication, the paper was presented by me for the online version of the Interact 2023 conference.

Study no. 4	Exploring Digitally Paths to Justice
Paper no. 4	Technological Pathways Towards Justice and Change: Exploring digital support and socio-political structures of gendered violence with victim-survivors of sexual abuse
Authors	Linnea Öhlund, Rikard Harr
Status	Manuscript submitted

My contributions: To start with the data collection for this study, an ethical review needed to be conducted and approved by the Swedish Ethical Review Authority. I wrote the entirety of the application with regular input from my supervisors. After approval, I wrote and disseminated the material for recruiting participants for the study. Firstly, I conducted a survey data collection which rendered 23 answers. After the survey, I successfully recruited 16 individuals, whom I then conducted interviews with, and later transcribed the interviews. The analysis of both the survey and interview data was divided between me and Rikard Harr. We read half of the material each to conduct the thematic analysis. I was in charge of writing most of the text for the paper with regular feedback, edits and text added by Rikard Harr.

Study no. 5	Social Justice in HCI – Theoretical study
Paper no. 5	Social Justice in HCI: Current Streams, Considerations and Ways Forward. Journal paper
Authors	Linnea Öhlund, Mikael Wiberg

Study no. 5	Social Justice in HCI – Theoretical study
Status	Published as a full journal paper in <i>Interacting with Computers</i> , Oxford Press, 2025

My contributions: As I was moving towards the final year of my PhD, my supervisor and I agreed that it was a good time to write a theoretical contribution to the topic of social justice, which I had worked with throughout the years. The direction of the paper was decided upon together and I conducted the initial literature review. From the literature review, I analyzed the material to create the themes or “streams” which we present in the paper. I was in charge of writing most of the text for the paper with regular feedback, edits and text added by Mikael Wiberg.

Study no. 6	Critiquing Interpersonal Safety Technologies
Paper no. 5	The Safest Woman Alive
Authors	Linnea Öhlund, Angelika Strohmayer
Status	Published as an extended abstract for the Alt-CHI track at CHI 2025

My contributions: The idea for this paper was born during a research visit to Northumbria University with Angelika Strohmayer. As the first author, I initiated the paper and started to sketch out the initial aim. We decided together on the direction of the paper. I collected the material for analysis with input from my co-author and conducted the analysis. I was in charge of writing most of the text with regular meetings and feedback sessions with my co-author.

Chapter 2 – A critical turn in HCI

Four waves, or paradigms, have shaped the development and evolution of HCI as a multidisciplinary field (Ashby et al., 2019; Bødker, 2015). Each wave had a different focus and perspective on the interaction between humans and computers, as well as the methods and values that guided the development of technology. Below, I give a brief introduction of the four waves of HCI to show how recently, more and more research has started to move towards a larger scope of addressing injustice and systemic issues.

The first wave, known as the engineering paradigm, emerged in the 1950s and 1960s and was influenced by the disciplines of engineering, mathematics, and psychology. The main focus of this wave was on the efficiency, accuracy, and usability of interaction, as well as the optimization of system performance and reduction of user errors (Duarte & Baranauskas, 2016). The typical methods of this wave were quantitative, experimental, and analytical, such as task analysis, cognitive modeling, and controlled experiments. The main design goal of this wave was to create user-friendly and error-free interfaces that matched the user's mental model and cognitive abilities (Duarte & Baranauskas, 2016; Grudin, 2005).

The second wave also known as the cognitive paradigm emerged in the 1970s and 1980s and was influenced by the disciplines of cognitive science, artificial intelligence, and linguistics. The main focus of this wave was the mental processes, knowledge representation, and communication of the user, as well as the understanding and support of the user's goals, tasks and problem-solving strategies (Bødker, 2015). The most common methodological approaches of this wave were qualitative, observational and descriptive, such as interviews, surveys and think-aloud. The main design goal was to create intelligent and adaptive interfaces that provide the user with relevant information and feedback (Bødker, 2015).

The third ethnographic or socio-cultural paradigm emerged in the 1990s and 2000s and was influenced by the disciplines of anthropology, sociology, and cultural studies. The main focus of this wave was on context, culture, and meaning of interaction, as well as the empowerment and participation of users. The typical methods of this

wave were interpretive, participatory, and critical, such as ethnography, participatory design, and action research (Frauenberger, 2019).

During this third wave of HCI, humanistic paradigms were introduced. As outlined by Bardzell & Bardzell (2013), critical theories such as Marxism, feminism and postcolonialism started to engage HCI scholars (J. Bardzell & Bardzell, 2016; S. Bardzell et al., 2012; S. Bardzell & Bardzell, 2011). These theories, despite being different in many ways, all seek to reveal and highlight underlying dominant structures of oppression and dismantle hegemonic power. The authors moreover discuss how these critical theories are “thoroughly political and emancipatory” and how they draw suspicion against positivistic notions of objectivity and raise questions on ideology blindness (J. Bardzell & Bardzell, 2013). For this third wave, notions of hegemonic power, subjective experiences and emancipation through empowerment paved the way for much future literature on social issues of a systemic nature.

This introduction to critical epistemologies paved the way for the proposed fourth wave, also known as the entanglement paradigm, as discussed by Frauenberger (2019). Emerging in the later 2010s and 2020s and influenced by the disciplines of philosophy, ethics, and design, the main focus of this wave lies on politics, values, and ethics, as well as the responsibility and impact of design on society and the environment. Typical methodological approaches of this wave are normative, evaluative, and transformative, such as value-sensitive design, design fiction, autoethnography and speculative design (Friedman et al., n.d.; Homewood et al., 2020; Vieira de Oliveira & Martins, 2014).

Main goalposts for this wave include reflecting and addressing systemic challenges to transform the existing social order and promote the well-being and dignity of all people (Bødker, 2015; Duarte & Baranauskas, 2016; Grudin, 2005).

It has been debated whether or not HCI has in fact moved into this fourth wave. I would then argue that this dissertation belongs within a suggested fourth wave building on arguments by Frauenberger (2019) and Homewood et al. (2020) and discussing aspects of rejecting positivist understandings – which I explicitly do.

As HCI has been reshaped throughout the years from the early 50s until now (2024–25), in the last couple of decades research has started to substantially evolve towards a more critical framing of ontology and epistemology. By starting to recognize how technology and computers have become an integral part of people’s lives (as also suggested by

Frauenberger, 2019), HCI researchers have started to foreground a larger engagement in socio-political change addressing communities at the margins of society.

The critical turn in HCI does not have a specific start or end. However, looking back over the last 16 years, much research now critically engages in concepts of power, privilege, equality, equity and justice in framing greater social justice engagement (J. Bardzell & Bardzell, 2016; S. Bardzell et al., 2012; S. Bardzell & Bardzell, 2011; Bellini et al., 2019; Corbett & Loukissas, 2019; Dombrowski et al., 2016; Ogbonnaya-Ogburu et al., 2020; Strohmayer et al., 2019a; Sultana et al., 2018).

As you will notice in this dissertation, I use the term socio-technical systems to describe digital technology used by people in society (Ropohl, 1999). Socio-technical as a term has been used throughout the history of informatics and is described by Stranks (2007) as, for example, “*the interaction between society’s complex infrastructures and human behaviour.*” While the term was originally used in conjunction with organizational development (Emery & Trist, 1960), in HCI socio-technical is often used to describe any type of digital technology used by people (software or hardware) in any society or environment, such as in Irani & Silberman (2013) in relation to ATMs or Bryant et al. (2005) in relation to Wikipedia and social media. Hence, in this dissertation, the term “socio” as in *socio-technical*, *socio-critical* and *socio-political* means “society.”

Moving to explore injustice and systemic issues

Over the last 16 years (2009–2025), we have seen a rising interest in HCI to explore injustice, systemic issues and the potential of socio-technical interventions. I further this exploration by presenting the growth of social justice as an area focusing on larger conversations of injustice, politics, and systemic oppression in HCI.

Taken together, the literature in this chapter provides a general overview of scholarly work in HCI exploring injustice and systemic issues. From this overview, I position my work within the growing movement (or area) of social justice in HCI to highlight the relevance of this thesis and the gap it attends to. It is important to recognize that HCI works on injustice and systemic issues are not always labeled as social justice. Papers on, for example, feminist HCI (S. Bardzell, 2010), critical theory and critical design (S. Bardzell et al., 2012), humanistic HCI (J. Bardzell & Bardzell, 2016) and the anti-oppressive design framework (Smyth & Dimond, 2014)

are all relevant examples of publications that are not explicitly about social justice but definitely discuss many values of social justice. Taken together, these papers are relevant because of their engagement with themes such as marginalization, oppression, sustainability and socio-political structures.

For a long time, informatics and HCI have engaged with socio-critical theories, approaches, methodologies and agendas to push for social change and equity. Through publications on social justice and critical domains such as feminism (S. Bardzell, 2010; S. Bardzell & Bardzell, 2011; D’Ignazio et al., 2016), critical theory (S. Bardzell et al., 2012), critical race theory (Ogbonnaya-Ogburu et al., 2020), Black feminist thought (Erete et al., 2021; Schelenz, 2021) intersectionality (Erete et al., 2021; Lan Fang, 2022; Ovalle et al., 2023; Schlesinger et al., 2017), gentrification (Corbett & Loukissas, 2019), racism (Erete et al., 2021, 2023), gendered violence (sexism) (Bellini, 2023; Bellini et al., 2019; Strohmayer et al., 2017, 2019a; Sultana et al., 2018, 2022) and post-colonialism (L. Irani et al., 2010), we can see how the interest in exploring social issues of a systemic nature remains highly prevalent.

To this day, one of the most influential papers in HCI discussing how HCI can more holistically and equitably move forward is “Social Justice-Oriented Interaction Design: Outlining Key Design Strategies and Commitments” by Dombrowski et al. (2016). Responding to thoughts on ethical, responsible, and accountable design, the paper develops social justice-oriented interaction design. The authors introduce “wicked” problems (or social injustices) characterized by the lack of clear solutions interlinked with social issues and needed political change. The term “wicked problems” as used in the paper is often used interchangeably with other terms in the social justice area, such as *social issues*, *social challenges*, and *systemic challenges* – all meaning injustice and systemic issues that are complex and hard to address.

The Dombrowski paper, published at CHI 2016, laid the foundation for many later publications and discussions due to its novel scope of explicitly shaping and discussing social justice in congruence with interaction design. Examples of this can be seen, for example, in Pendse et al. (2021) when discussing social justice and pathways to care, in Prost et al. (2018) in relation to food democracy, and in Strohmayer et al. (2017) concerning the possibility of social justice outcomes through digital interactions.

In parallel with the influential paper by Dombrowski, the papers “Social Justice and Design: Power and Oppression in Collaborative Systems” (Fox et al., 2017) and “Exploring Social Justice, Design, and HCI” (Fox et al., 2016) are also considered influential work on opening up social justice discussions in the HCI community. In the CHI workshop from (2016), Fox et al. were among the first in HCI to gather scholars working with explicit questions on social justice, including systemic oppression intersecting technologies and interaction design.

The following year, Fox et al. (2017) held a similar workshop at CSCW expanding on how power and privilege within research communities themselves are highly important to examine as part of the growing agenda to address systemic injustice. Through the panel and workshop, the authors (of whom the majority are the same in both papers) brought in larger conversations on practices, strategies, tools and perspectives on how social justice can interlink with design.

These two workshops already then noted how HCI had started to move into a large critical scope of socio-political ideas, and how social justice not only examines systemic oppression amongst communities from the margins but also recognizes how socio-technical systems can be part of such issues. These conversations were not completely novel to the HCI community at that time. However, from 2016 and onward, more and more calls came in for research to take a stronger stance in socio-politics. Such calls for stronger political agendas can be noted in, for example, Erete et al. (2021) calling for HCI to stand in solidarity of Blacks in computing, in Sharma et al. (2023) when discussing post-growth of technology and by (Bellini, 2023) urging socio-technical companies to take more responsibility in mitigating economical gendered violence. Arguably, these movements forward could be taken as a move into a fourth research paradigm in HCI as discussed by for example, Homewood et al. (2020) and Frauenberger (2019).

In parallel with this growth of interest in HCI to explore injustice and systemic issues, some common ground has formed, and some questions still remain.

One common argument noticeable in many publications exploring injustice and systemic issues discusses moving away from the idea of always suggesting technology as the solution for the issues we see. While we are, understandably human–*computer* interaction researchers, more

and more voices are being raised to move away from technology production and consumption. For example, (Strohmayer et al., 2019a) discuss how universal technological solutions for inherently specific, complex and context-dependent issues may reinforce harm and negative consequences for those most affected. They argue that HCI has an inherent tendency to assume that technology can solve all types of issues. This assumption then leads to overtly solutionist ideas where researchers seek to dismantle large social issues with small technological means.

Similar arguments are centered by (Sultana et al., 2018) in discussing the pitfalls of seeking to design technological solutions for women living under heavy patriarchal norms in rural Bangladesh. Their study demonstrated that women of low income might not benefit from just any technological intervention. Instead, careful attention to social structures of that area, gender norms, family values and relationships are imperative to even begin addressing issues of such scope and scale.

This movement away from technology production is echoed by, for example, Dombrowski et al. (2016) when discussing social justice as a horizon to work towards, not a utopian future created through technological solutions. Moreover, in Dimond et al. (2013) and Strohmayer et al. (2017), similar arguments are discussed by staying clear of suggesting more technology for street harassment and gendered violence.

A last example of this movement away from overtly promoting technology is discussed in the paper “Mapping the Margins: Navigating the Ecologies of Domestic Violence Service Provision” by Bellini et al. (2019). The research findings are centered around strengthening already existing and implemented service delivery towards survivors of domestic violence. The authors point to the importance of not always making novel technological solutions through the argument that “novelty” isn’t always the best or needed. We don’t always need new artifacts.

What is noticeable here is that in HCI research exploring injustice and systemic issues, making or creating technology is not always the best answer. What we can take from these discussions is a collective idea highlighting the importance of moving away from making new technology as a given solution to social issues. Addressing systemic oppression instead demands larger attention towards socio-political structures and occasionally building on already existing tools.

Hand in hand with these discussions of not using technology to solve social issues of a systemic nature are arguments of prioritizing structural change over interpersonal change. While technology can indeed be used to support individuals with experiences of complex social issues such as in Andalibi (2016), Andalibi et al. (2018), D'Ignazio et al. (2016), and Sultana et al. (2018, 2022), an overt focus on individual change might divert important attention from the core issues of systemic oppression.

This is discussed in, for example, Sharma et al. (2023), who point to how sustainability is an issue bigger than what any individual can take on. The authors argue that despite the possibility to create technologies to persuade individuals to challenge their unsustainable behavior, interventions will likely fall short because they fail to address many of the core issues of environmental damage. While individuals surely have the power to change their behavior towards being more sustainable, it is industries such as, for example, fuel, energy and fast fashion that need to lead change.

Failing to address the root cause of injustice and systemic issues is moreover often a point of argument when exploring how individual change might not help socio-political change. In Bellini et al. (2019), similar arguments are put forward when discussing technological interventions to fight domestic violence. Despite there being a plethora of HCI work focusing on gendered violence prevention, the literature often overtly focusses on safety strategies for women to protect themselves. By constantly suggesting technological artifacts for individuals to buy, learn, and use for their own protection, we miss out on analyzing why they need protection from the very beginning.

Moreover, Smyth & Dimond (2014) discuss anti-oppressive design and stress that socio-technical projects focused on assisting the individual are an important part of HCI. The authors point to the importance of designing for the individual but also argue that without showing any interest in addressing the structures causing oppression, no long-term change is possible.

What is important to highlight here is that these conversations on the focus towards larger socio-political structures is not meant to downplay the importance of technology for individual support. To the contrary, much HCI literature exploring injustice and systemic issues shows the importance of centering on the individual in socio-technical systems

because structural change is not possible. In, for example, Sultana et al. (2018), the authors propose a digital tool for women with the intent to design *within* the patriarchy. Despite initial intentions of wanting to design to dismantle patriarchy, the scope of this was too grand and the consequences deemed too serious for the women they were working with. Instead, the authors focused on a middle ground where they constructed a system that could directly assist the women while not causing any further harm. Similar takeaways can be seen in Sultana et al. (2022), Sambasivan et al. (2019) and Saha et al. (2024).

These arguments pointing to the importance of addressing socio-political structures in congruence with individual capabilities pinpoint that in HCI we have come too far to not care about the greater challenges behind injustice. We also learn in the paper “Critical Race Theory for HCI” by Ogbonnaya-Ogburu et al. (2020) how everyday socio-technical systems that researchers use are built and often designed on false neutrality and colorblindness. By bringing in critical race theory, the authors challenge “neutral” technology and point out the existence of embedded racism brought on through liberalistic and capitalistic ideas. The paper got a best paper award at CHI 2020, and for this dissertation I position it as a paramount work of social justice through its way of challenging the HCI research community to engage in deeper work on anti-racist efforts and our own privilege and power.

Similar arguments are presented in the paper “A Method to the Madness: Applying an Intersectional Analysis of Structural Oppression and Power in HCI and Design” by Erete et al. (2023) in which authors posit Black feminist epistemologies to foreground discussions on how HCI and design “*falsely perpetuate a lens of neutrality and colorblindness that centers on whiteness, innovation, and capitalism and ignores the history of State-sanctioned violence and structural oppression.*” Through the paper, we learn about the still ongoing active discrimination against Black female scholars and the importance of an intersectional approach to research. Parallel arguments on the imperative power of socio-technical systems are brought forward by Corbett and Loukissas (2019) in the paper “Engaging Gentrification as a Social Justice Issue in HCI.” The authors direct attention to the structural challenge of forced displacement by low-income populations through capitalistic housing development. At first glance, gentrification might not seem technology related and hence not approachable through technology. However, despite this initial

disconnection, the authors show how and why HCI researchers might contribute to this problem.

Summary

Moving from the three original paradigms in HCI towards a suggested fourth, I started this chapter by discussing how HCI has evolved through the years. Secondly, I outlined a growing movement towards more socio-critical perspectives. I have shown how an area called social justice has grown in HCI over the last 16 years from only a couple publications each year to an area attracting more and more attention. The literature captures a plethora of complex social issues that HCI researchers work to address.

Chapter 3 – Theoretical values

In the earlier introduction and background section, I presented a set of examples of HCI literature centering on injustice and systemic issues. I moreover argued that this interest has grown in HCI during the last 16 years. Through this growing socio-critical interest, social justice has come to be established as an area of its own and is often associated with literature on, for example, oppression, justice, equity, stigma and marginalization. As the social justice area in HCI is relatively new, broad and without static definition, four values have instead prompted collective ideas.

This third chapter situates the thesis within the broader social justice area in HCI by providing an overview of common shared values and showing how my research aligns with these ideas. As I present these values and common ground of social justice work in HCI they can be taken as the theoretical framework from which I have shaped much of my work. While there are many ways to abstract common values from the social justice field in HCI, these are the ones I have encountered most often during my years as a PhD and have engaged with in the papers included in this thesis.

Value 1: Addressing marginalization

Throughout the growth of social justice initiatives in HCI, one common idea is the positioning of communities that have long been overlooked not only by the HCI research field, but by society. In other words, individuals and communities at the end of marginalization. Social justice as a socio-critical discourse considers marginalization to be the result of systemic oppression and intersecting structures of discrimination, as opposed to, for example, personal choices and attitudes. This is an important distinction (Bellini et al., 2022; Dombrowski et al., 2016; Fox et al., 2016, 2017).

HCI literature attending to marginalization includes, for example, racial discrimination (Erete et al., 2021, 2023; Ogbonnaya-Ogburu et al., 2020), gendered violence (Bellini, 2023; Bellini et al., 2019; Dimond, 2011), ageism (Ivan & Cutler, 2021; McDonough, 2016; McMurtrey et al., 2011), patriarchal stigma (Ahmed, 2019; Sultana et al., 2018, 2022), trans identities (Keyes, 2018) and queer communities (Beare & Stone, 2021).

What is moreover important to mention is how no individual should be taken as a unanimous voice for a whole community. One person has the experience of one person. However, and as discussed in the introduction chapter, marginalization as a result of systemic oppression is in this thesis understood to occur through the discrimination of individuals based on social classifications such as race, gender, religion, culture, etc. This means that classifications such as, for example, female + gay or Indigenous + Black most likely create shared experiences of discrimination.

Here, I would like to take the opportunity to mention two vital concepts when working with systemic oppression: The *matrix of domination* (M.O.D) as a theory developed by sociologist Patricia Hill Collins and *intersectionality* as a concept coined by activist and scholar Kimberlé Crenshaw.”. Originally the M.O.D concept was used to discuss the specific discrimination against Black women in America as a particularly marginalized group. Collins argued that being Black meant being subjected to racism and being a woman to sexism (P. Collins, 2006; P. H. Collins, 2000). This type of marginalization demanded special considerations and through the four domains of power (structural, administrative, hegemonic, and interpersonal), Collins could demonstrate how Black women suffer from discrimination through a multitude of social levels such as legal, structural, medial, and personal.

In the development of the concept, Kimberlé Crenshaw positioned intersectionality to similarly explain the discrimination of Black women from both feminist and antiracist movements (Crenshaw, 2013). Crenshaw built on intersecting identities and argued that interlocking systems of power affect those most marginalized in society. Overall, what these two concepts entail is that some social classifications are advantaged to disadvantage others through the whole of society, and this is the core of systemic oppression.

The matrix of domination and intersectionality have been attended to in some social justice literature such as in, for example, Erete et al. (2023), Schlesinger et al. (2017), and Chordia et al. (2024). Moreover, as you will come to see, I use the four domains of power in one of my later articles. While I won't dive deeper into the concepts here, I argue that they are both imperative, not only to my own work but to all work on social justice because they recognize the structural dimensions of injustice causing marginalization to many communities.

To summarize, one of the main values of social justice is the recognition that systemic discrimination against certain communities is based on the disadvantages of social classifications, and this is the core of systemic oppression and injustice. Hence, social justice deals with lived experiences of oppression as impacted by the socio-political context of social classifications (for example, gender, class, race, ethnicity, sexual orientation, ability, age, etc.).

Value 2: Positioning un-neutrality

Another common value in social justice positions the research we conduct is not neutral and will not render neutral contributions. This is an important point to make as contexts of injustice and systemic issues are heavily shaped by politics and legislation.

I build on the work of Dombrowski et al. (2016), which describes how working with questions of injustice can require scholars to engage directly in or run in tension with, for example, laws (which can actively discriminate, marginalize and harm certain communities), social politics, funding agencies with capitalistic intentions, or the status quo of society.

This engagement is necessary because in many cases what lies at the core of systemic oppression is socio-political structures that directly affect communities. For example, (Strohmayr et al., 2019a) discusses the importance of analyzing the historical, legal and political circumstances of research, which in her case concerns a sex-worker organization. In many countries, sex work is highly stigmatized and illegal, which means that individuals partaking in that line of work are often particularly vulnerable to violence and discrimination without possibilities to access legal aid. Moreover, as discussed by Irani et al. (2010) in the context of, for example, post-colonial research, not taking into consideration historical events and discrimination would be to disregard many important nuances of a phenomenon.

Another example highlighting the importance of socio-political analysis and engagement is discussed by Sultana et al. (2018) in relation to attempts to design technologies to support low-income women living in rural Bangladesh. Despite good intentions, the authors quickly realized that the social ecosystem in which the women live and the intricacy of conservative and patriarchal structures in rural Bangladesh would most likely lead to negative consequences for the women who participated in the study. This paper discusses many important nuances of working with

communities that are heavily affected by oppressive structures and the importance of recognizing these complexities so as to not cause more harm.

What this value of social justice entails is that we as researchers must understand that the research we conduct and the technologies we put out are neither neutrally made nor will be neutrally implemented. Instead, this type of anti-neutrality has grown in importance through the engagement with social issues stemming from unjust conditions. How could we ever address an un-neutral issue with neutral values?

Moreover, this value is important for social justice research because it means that researchers try to account for how any technological intervention might be received. In the case of Sultana et al. (2018), this meant that researchers could not simply give an artifact to a woman from rural Bangladesh because phones were mostly used and controlled by their men. In the case of (Strohmayr et al., 2019a), it meant staying with an already existing tool that accounted for the complex lives of sex workers instead of attempting to create something new.

What these examples highlight is that when working with topics of injustice, we cannot assume that the contributions of our research will be of a positive nature. Instead, we must work together with members of the community we are trying to reach to uncover the contextual limitations of our research to limit harmful interventions.

So, to summarize, an important part of social justice is to recognize and engage in the socio-political context of research even if this can mean running in tension with current laws, policies and morals. We must do this so as to limit the potential negative consequences of our research that can lead to increased harm towards those we are trying to support.

Value 3: Technology is not the solution

In HCI, technology is occasionally treated as a key to solving systemic oppression and social justice as a future utopia, as discussed by, for example, Bellini et al. (2022) and Chordia et al. (2024). This type of over-belief in technology is often criticized in social justice research as solutionist and capitalistic thinking, i.e., that the production of technology will solve highly complex social issues (Chordia et al., 2024; Dombrowski et al., 2016; Sharma, Kumar, et al., 2023).

This type of misguided thinking is argued to limit long-term and substantial research contributions as technological artifacts can never be the single solution to injustice and systemic issues. While it might seem obvious that the technological artifacts we create will not solve, for example, gendered violence or racism, occasionally in HCI we overestimate the opportunities technology can provide.

It is understandable that many times researchers (especially early-career researchers) seek to design and make products that look good and can seemingly solve a complex issue at hand. Clear examples of these can be found in contexts of trying to design for public sexual violence prevention where technological interventions often consist of artifacts for the potential victim to wear or use (see, e.g., Chougula et al., 2014; Patel & Hasan, 2018; Viswanath et al., 2016). While these artifacts might in marginal cases prevent direct attacks, these interpersonal technologies rarely address the core issue at hand.

It is understandable to some point that many researchers find it difficult to address systemic structures causing injustice and harm instead of a clearly articulated problem. However, looking past these initial ideas of solving social issues with technology we can then better understand the limitations and opportunities of technological interventions, as discussed by Chordia et al. (2024) and Dombrowski et al. (2016).

What unites social justice research attending to social issues and technology is that it often works to recognize the contextual restraints of systemic oppression. While such research may still suggest technological *interventions* (instead of solutions), it often describes and discusses what else is needed to facilitate substantial change for the community in question.

To exemplify, although we perhaps cannot completely stop sexual violence against women through technology, we can support victim-survivors in their process of recovery through socio-technical systems, such as those discussed in Andalibi et al. (2018). Moreover, it is not possible to technologically solve child sexual abuse, but we can attempt to limit violence and stigma often experienced by the victims through digital support systems (Sultana et al., 2022). Lastly, while we will not be able to directly solve forced displacement as the result of economic inequality and capitalism, we can work to shape technology so as to challenge the forces behind gentrification (Corbett & Loukissas, 2019).

So, in summary, social justice challenges solutionist arguments that position socio-technical artifacts as solutions, often by means of production and consumption. The area also goes against earlier notions of seeing technology development as inherently progressive.

Value 4: HCI can perpetuate systemic oppression

The last value brings in discussions on how the HCI research community can be part of and perpetuate lived experiences of systemic oppression. For example, Erete et al. (2021) discuss their experiences as Black female academics in HCI. The authors discuss how there is no separation between the systemic oppression of Black communities and their lives as researchers in academia and present a plethora of examples that highlights the ongoing discrimination towards Black female scholars within HCI and related computing areas.

In another article discussing the inherent connection between research and oppression, Irani et al. (2010) bring in discussions on postcolonialism and computing. Although the two topics are perhaps seemingly unrelated, the authors discuss how the world we live in is shaped by the colonial histories of the past. This is moreover discussed in additional research by Ogbonnaya-Ogburu et al. (2020) who centers critical race theory as a call to action for HCI researchers (and research) to engage in anti-racist actions. A part of this means recognizing how privilege can shape the outcomes of our research. As we come from different backgrounds and perspectives (and social classifications), these are aspects that shape who we are and how we act.

Similarly, Corbett and Loukissas (2019) discuss how the HCI community can both enable and challenge the systemic issue of gentrification. According to the authors, HCI researchers are more likely to not engage in gentrification issues because of lack of exposure due to their educational background. Furthermore, authors also highlight how HCI researchers would most likely be gentrifiers themselves. Such reflections on researchers own power and privilege can moreover be seen in (Leal et al., 2021) in the context of activism, in (Rankin et al., 2021) when discussing the underrepresentation of black women in CS and in (Le, 2024) discussing neuronormative assumptions.

What these conversations summarize is how HCI and its researchers do not stand apart from systemic oppression and injustice. While we might work against systemic oppression through our careers, this does not

automatically mean we as individuals cannot be part of said oppression. These above examples of systemic issues bring in important nuances to remind ourselves not to disregard our own power and privilege.

Summary

Taken together, these four values, i) addressing marginalization, ii) research is not neutral iii) technology is not a solution, and iiiii) HCI can perpetuate systemic oppression, represent common ideas of social justice in HCI. For this thesis, they have shaped the work and act as a sort of a glue for the empirical cases they are part of.

Chapter 4 – Methodological framings

In the following chapter, I will start by introducing common methodological approaches when seeking to work with social issues of a systemic nature in HCI. After this methodological background, I zoom in on a general methodological approach for this thesis before coming to the empirical work included. For each of my studies, I provide a short description of the research objective, data collection method, recruitment process, type of analysis and, lastly, a methodological reflection.

Approaching injustice

When working with injustice and systemic issues in HCI, the majority of researchers elicit qualitative data collection. Such inquiry can, for example, consist of qualitative surveys (Asad, 2019, 2019; Schlesinger et al., 2017), unstructured or semi-structured interviews (Bellini et al., 2019; Dimond, 2011; Strohmayer et al., 2019a; Sultana et al., 2018), workshops or focus groups with open discussions (Asad et al., 2017; Björgvinsson et al., 2012; Freed et al., 2017), or ethnography and autoethnography as methods of probing the complex nature of injustice (Erete et al., 2021, 2022; Ogbonnaya-Ogburu et al., 2020).

Firstly, when exploring questions of systemic oppression and marginalization, scholars must focus on individuals, groups and communities who have lived experiences of such issues and actively include them in research (Erete et al., 2023; Strohmayer et al., 2019a; Sultana et al., 2018, 2022). This is not always an easy task, as working with communities who have faced marginalization can require longer recruitment processes, a higher level of gatekeeping and more considerations by the researcher (Grimwood, 2015; Strohmayer et al., 2019a; Sultana et al., 2022). However, despite a potentially complex process, researchers must ensure democratic and fair collaboration. Secondly, ethical considerations are important throughout the entire research process as members of marginalized communities often have harmful experiences not only from society but through scholarly work (see for example (Dombrowski et al., 2016; L. Irani et al., 2010; Rankin et al., 2021; Sultana et al., 2018)).

Ethical considerations towards methodological approaches should not only attend to official ethical approvals or university guidelines (this is a bare minimum) but pay careful attention to in what ways research can

itself harm participants. Can the method used for data collection create more marginalization or stigma? Will research questions reproduce stereotypes? Who will benefit the most from your research, you and your career or the community itself? Being considerate of these questions is not a simple task, but is immensely important so as to not facilitate harm. (Bellini et al., 2019; Strohmayer et al., 2019a; Sultana et al., 2018)

All of the studies in this thesis include methods of data collection and analysis common in related scholarly work on HCI and social justice. Through semi-structured interviews (Studies 1–4), surveys (Study 4), a scoping review (Study 5) and a literature critique (Study 6), I have worked to frame voices from often marginalized communities with lived experiences of systemic oppression.

When working with injustice and systemic issues, one way of being attentive to complexities of such issues is to contextually adapt our methodological approaches and ways of collecting data, as seen in, for example, Asad (2019), D'Ignazio et al. (2016), and Sultana et al. (2018). By critically analyzing harms and benefits of our methodological approaches, we can to a better extent limit harm and injustice.

Occasionally, when working with groups who face systemic oppression, using approaches that include a fixed set of tools can become limiting. Instead, what many social justice researchers turn to is more of a “practical” approach – first and foremost they need to include participants with certain experiences and perspectives (Asad & Le Dantec, 2015; Corbett & Loukissas, 2019; Newell & Gregor, 2000; Strohmayer et al., 2017, 2019a; Sultana et al., 2018, 2022). The inclusion of these individuals is what sets the possibilities and boundaries for the methodological approach, not the other way around.

Social justice research often highlights the importance of actually centering the lived experiences of those who are at the end of systemic oppression. Whether through established methods such as participatory design (PD) or ethnography (Björgvinsson et al., 2012; Erete et al., 2021; Lewis et al., 2023; Lindsay et al., 2012) or through more tailored approaches (Erete et al., 2022, p. 22; Sultana et al., 2022), the most common method used for data collection is interviews (Bellini et al., 2019; Strohmayer et al., 2019a; Sultana et al., 2018, 2022). The objective of interviews in social justice research is to give marginalized voices a platform and outlet for their personal experiences of systemic oppression and the issues arising from that. As you will come to notice, interviews are

also the most common way of data collection for this thesis, which can be seen in Studies 1–5.

However, selecting a methodological approach should not be done without careful consideration and sensitivity to the research phenomenon. In, for example, “Design Within a Patriarchal Society: Opportunities and Challenges in Designing for Rural Women in Bangladesh” by Sultana et al. (2018), the authors move away from common HCI methodologies, arguing for how most Western-used approaches cannot account for the complexities in contexts where social structures are more abstract. In the article, the authors directly argue against the usage of participatory design. As one of the main objectives in participatory design is to include not only the “community at risk” but also stakeholders, the authors claim that this could render more harm against their participants since the stakeholders in their study cannot be held accountable in the same way as in a Western society. This shows how even broad and well-established methodologies like PD cannot be used without careful and critical sensitivity when working with social issues of a systemic nature.

This is not a direct critique against participatory design in HCI because methodologies such as participatory design, participatory action research, ethnography, autoethnography, case studies and literature studies are well established within social justice and justice related HCI literature (see Asad & Le Dantec, 2015; Bellini, 2023; Chordia et al., 2024; Erete et al., 2016; Grimwood, 2015; Ogbonnaya-Ogburu et al., 2020; Strohmayer et al., 2017). Instead, I use PD and the example of Sultana et al. (2018) as a placeholder to highlight that when working with social issues of a systemic nature, no methodology should be assumed to be perfect without careful consideration.

As I have attempted to highlight, when working with large and delicate questions regarding injustice and systemic issues, many researchers see the need to be flexible in relation to their specific (often sensitive) research context. Hence, what is most important is to sensibly try to include individuals and communities that have lived experience of the phenomenon we seek to address.

Flexible in this context does not automatically mean easy. Maybe the participants are very hard to find and subjected to a lot of stigmas in society? Then perhaps it will be hard to do focus groups or workshops. Are the participants, for example, living under heavy pressure from close family? Then perhaps individual interviews are not possible. Could it be

harmful to directly involve the community in question? Are there others who are in close relation to them that can be asked about their perspective? Flexibility means to do what is possible to ensure the participation and collaboration of individuals and communities without excluding them or eliciting negative consequences.

In summary, collecting data on injustice and systemic issues demands methodological approaches that assist researchers to carefully and mindfully build relationships and gather data through collaborative actions. With this short summary of common methodological approaches when researching social issues of a systemic nature in HCI, I now move to discuss my own studies.

Overview of study methodologies

For all of my studies, I have worked with various aspects of injustice through questions, marginalization, discrimination and systemic oppression. Early on in my PhD, I adopted social justice as a way to work with these complex questions. Through each of the studies in this dissertation, my knowledge on how to work with and methodologically approach injustice and systemic issues has grown accumulatively. I learned how my background can influence how participants feel about interview questions, as in Study 1. I learned how to become a better listener, as in Study 2. I learned how hard and complex it can be to recruit participants with certain lived experiences, as in Studies 3 and 4. And through my engagement with questions of social justice throughout the years, I was able to conduct the fifth theoretical study and sixth critical study. You can read more about this in the methodological reflections.

Study 1

Research objective: The goal of my research team was to evaluate two prototypes in regard to user experience, specific values of the Sámi people, important features of digital archives and cultural sensitivities.

Data collection method: This user study included interviews and a design walkthrough of our prototype. Before we recruited and invited participants, we conducted a pre-interview with a Sámi woman to ensure our questions were not prejudiced or harmful. Each participant was asked to do a pre-interview, then a design walkthrough, and then a follow-up interview.

Recruitment process: Because of our research objective, we used purposeful sampling to invite 3 individuals with Sámi experience AND archival experience, 3 individuals with Sámi experience AND no archival experience, 3 individuals without Sámi experience AND archival experience, and 3 individuals with no Sámi experience AND no archival experience, for a total of 12 participants (*see Table 1*).

Analysis: We analyzed the rich material from our interviews by conducting a thematic analysis. The first author of the paper and I divided the interviews in half and read through the material to get an initial overview of codes. Then we jointly went through the material to analyze what codes could be turned into themes. In the end, we had four themes based on different thematic features of the archives. The themes included tonality of the prototype and design, overall usability, sociability, and ethical considerations.

Methodological reflection: The study “Digital Access to Sámi Cultural Heritage” deployed various methodological approaches to ensure the inclusion of important values and perspectives of the Sámi community in the design of a digital archive. As described above, this was done through a study including interviews and a design walkthrough with 12 individuals from various backgrounds. From this first study and article, I obtained a deeper understanding of the breadth of complexities surrounding the oppression of the Sámi people.

Many Sámi individuals we interviewed expressed that they had a complex relationship with their heritage due to the large displacement of the Sámi population in the early 1900s by the Swedish government. As a result, many felt a disconnection with their heritage and language as their older relatives had been forced to speak Swedish instead of their local languages. We conducted a pre-interview with a Sámi woman to limit insensitive questions. Despite this, we had one person of Sámi descent saying that one of our design features was making a fool out of the Sámi population by asking visitors to the archive to answer “too obvious” questions. This was a good lesson. Conducting research together with individuals in a historically complex and nuanced context *demands* consideration and sensitivities.

Table 1: Overview of participant details from Paper 1.

	Knowledge about Sámi culture	Limited knowledge about Sámi culture
Experience and knowledge of archives	Group 1. 3 participants 2 from Sámi community	Group 2. 3 participants
Limited experience and knowledge of archives	Group 3. 3 participants 2 from Sámi community	Group 4. 3 participants

Study 2

Research objective: I set out to explore how older adults aged 65+ used and felt about digital technology during COVID-19. The aim of the paper was to highlight the need to incorporate societal factors (as opposed to individual) into research about older adults and technology use in HCI.

Data collection method: To explore how older adults used and felt about technology during the COVID-19 pandemic in Sweden, I used interviews to collect rich and qualitative data. I could not physically meet my participants since the Swedish government had recommended social distancing. Instead, I offered the opportunity to have interviews on Zoom or by phone. All participants preferred interviews by phone.

Recruitment process: By googling local senior citizen organizations I found members with their email posted on the websites, which became the initial point of contact. I contacted 11 men and 18 women and 3 men and 8 women responded. From those who initially said yes, some older adults suggested friends or acquaintances who they thought would be interested in being part of the study. Through this snowball sampling, a total of 15 older adults were recruited to take part in the study (see Table 2).

Analysis: The data was transcribed into non-verbatim documents. The transcripts were then analyzed by me and two other researchers, starting with highlighting excerpts that either stood out or were similar. After this, we sorted the excerpts into categories and then into themes. The data analysis resulted in three themes, which together discussed different aspects of socio-political issues related to aging and digitalization: 1) The Importance of Technology to Live a Connected Life, 2) Force and

Frustration from Technological Advances, and 3) Societal Exclusion Through Technological Assertion.

Methodological reflection: I would argue that the interviews I conducted were the most practically adequate choice for this study and its specific context of post-COVID Sweden. For the sake of my study, the pandemic context had already forced my participants to reflect on the negative and positive aspects of digital technologies. This fact made interviews a good way of discovering the participants' newfound realizations concerning digital technology. In the case of being sensitive towards my participants, I tried to step out of assuming a lot of things. For example, how seniors don't like technology (which I read a lot about in related literature) or how a big societal issue was that many were getting older but there were less people looking after them. None of these aspects took into consideration the feelings and circumstances of the older adults I interviewed.

Table 2: Overview of participant details from Paper 2.

Participant no.	Gender	Age	Living status	Earlier Occupation
1.	Male	70	Co-habiting	Financial manager
2.	Female	71	Co-habiting	Teacher
3.	Female	76	Live alone	Manager
4.	Female	70	Co-habiting	Nurse
5.	Female	69	Live alone	Nurse
6.	Female	70	Co-habiting	Occupational therapist
7.	Female	77	Live alone	Teacher
8.	Female	74	Co-habiting	Tax-worker
9.	Female	73	Live alone	Teacher
10.	Male	70	Live alone	IT specialist
11.	Female	76	Live alone	Culture worker
12.	Female	80	Co-habiting	Technician
13.	Male	70	Live alone	Administrator
14.	Female	71	Live alone	Manager
15.	Female	79	Co-habiting	Teacher

Study 3

Research objective: In this study, my co-author and I framed technology-facilitated trafficking as the social and technical ecosystems wherein individuals use information and communication technologies to engage in human trafficking. We brought in arguments regarding how legal frameworks, government models and politics intertwine with efforts to intervene in sex trafficking.

Data collection method: The study, which we described as an “expert pilot study,” was conducted by interviewing six women working with human and sex trafficking, gender inequality, gendered violence, and child abuse. The interviews all took place online through Zoom.

Recruitment process: I sought out a variety of people working with questions related to technology-facilitated sex trafficking to interview them about their line of work and the complexities of their duties. Some of them I recruited through personal connections though the local women’s shelter at which I volunteer. From those initial connections, the rest were suggested to me through the recruitment process called snowball selection. The range of participants was wide and included individuals from the Swedish Police Authority, non-governmental organizations, a women’s shelter, municipality coordinators against sex trafficking, and a child psychologist (*see Table 3*).

Analysis: My co-author and I conducted a thematic analysis by dividing the material and reading it separately. We then compiled and, on a whiteboard, listed different codes that we had highlighted. We then clustered together the codes which shared similarities and through iterations ultimately arrived at three approaches for HCI anti-trafficking efforts: 1) Legislation of Social Media Abuse 2) Designing for Fuzzy Boundaries and 3) Malicious Scenarios for Anti-trafficking Awareness.

Methodological reflection: As I have discussed earlier, it is very important to include individuals with first-hand experience of the issues framed in social justice HCI research. However, for this study, recruiting women with lived experience of sex trafficking was not deemed appropriate. This is because I was at the time an early-career PhD student with limited abilities to conduct such interviews. The reason we nevertheless chose to go on with the study was because of the larger focus on legal systems, aid organizations and authorities, which meant that these individuals would have extensive knowledge on how systems on trafficking worked. This choice meant that through a purposeful sampling, we could deepen our

knowledge to a certain level with people who are often the first line of help and assistance for survivors of sex trafficking, such as police officers, shelter volunteers and child psychologists.

Table 3: Overview of participants from Paper 3.

Participant pseudonym	Organization	Title	Role
<i>Ingrid</i>	<i>Non-governmental organization supporting women in sex work</i>	<i>Board member</i>	<i>Coordinator of organization</i>
<i>Roberta</i>	<i>A Swedish municipality</i>	<i>Coordinator against human trafficking</i>	<i>Lead researcher of field operations</i>
<i>Sara</i>	<i>Local women's shelter</i>	<i>Volunteer</i>	<i>Support provider for women in sex work</i>
<i>Anastasia</i>	<i>Non-governmental organization for fair sex initiatives</i>	<i>Director and founder</i>	<i>Daily management and head of operations</i>
<i>Petra</i>	<i>The Police Authority</i>	<i>Superintendent</i>	<i>Lead coordination of sex-trafficking data collection</i>
<i>Bea</i>	<i>Family center for children</i>	<i>Psychologist</i>	<i>Head evaluator of child abuse</i>

Study 4

Research objective: The purpose of this study was to explore how digital technology can support independent paths to justice for women with experience of sexual violence while also discussing needed socio-political change to address gendered violence.

Data collection method: For this study, I used a qualitative survey and semi-structured interviews. The survey was designed to give those potentially interested in participating in the study a way of getting acquainted with the aim without having to contact me (see Table 4). At the end of the survey, there was a place to add contact information if the responder would consider participating in the following interviews. Through the surveys, I found 12 participants willing to take part in the interviews. I recruited 4 more women through the original call for participation, resulting in a total of 16 interview participants (see Table 5),

The interviews were used as a way to deepen the knowledge of participants' experiences and to give them an opportunity to tell their own stories. By sharing the results from the survey and discussing thematical results I held semi-structured and open interviews with my participants. It was important to give participants space to discuss and share their stories and this is the reason why many interviews were up to an hour long.

Recruitment process: The recruitment process was complex in the sense that I had to adhere to the rigorous context of the ethical application for the study while being open enough to find participants. Originally, I sent out a call for interviews asking individuals to contact me directly. However, after only finding one person after three months, I redesigned the method of data collection to be more flexible for potential participants. I sent out calls for the survey through personal contacts, public billboards in Umeå and Facebook groups. After this change of recruitment process, I ended up with 23 survey responses.

Analysis: From the 23 responses collected through the surveys, we used thematic analysis to gather themes and codes. We formulated the questions for the interviews based on the survey responses. The interviews yielded much material, for which we also used thematic analysis to process. In the end of the data analysis, we concluded with five themes. The first was 1) experiencing sexual abuse. From this, we moved on with 2) sharing sexual abuse, and 3) obtaining justice from sexual abuse. The fourth theme revolves around 4) recovering from sexual abuse, while the fifth centers on 5) preventing sexual abuse.

Methodological reflection: For this study, it quickly became clear that finding participants would be immensely difficult. Despite deploying calls for participation through email lists, Facebook groups, women's shelters and through flyers at Umeå University, I had only recruited one participant in three months. This is what led me to create an anonymous survey as a way to get into contact with potential participants on their terms. Going into this study, I challenged myself and all that I had learned from my earlier studies on how to conduct research together with groups who have experience of interpersonal and systemic oppression. I knew the data was going to be very sensitive, the context complex, the participants hard to reach, and that conducting an ethical review meant potentially limiting the openness I had relied on in my earlier studies.

Table 4: Overview of survey participants from.

Participant no.	Age group	Educational background
1.	18–25	University degree
2.	n.a.	Folk high school (vocational college)
3.	26–35	University degree
4.	26–35	High school
5.	36–55	University degree
6.	26–35	Master's degree
7.	18–25	Master's degree
8.	26–35	High school
9.	18–25	University degree
10.	26–35	University degree
11.	18–25	PhD
12.	18–25	University degree
13.	26–35	University degree
14.	26–35	PhD
15.	18–25	University degree
16.	26–35	PhD
17.	36–55	University degree
18.	18–25	University degree
19.	26–35	High school
20.	26–35	PhD
21.	18–25	Master's degree
22.	26–35	High school
23.	36–55	PhD

Table 5: Overview of interview participants from Paper 4.

Participant	Occupation	Geographical background
1.	Student	Southern Europe
2.	Student	Sweden
3.	Nurse	Sweden
4.	Student	Sweden
5.	Student	Sweden

Participant	Occupation	Geographical background
6.	<i>Student</i>	<i>Sweden</i>
7.	<i>Associate Professor</i>	<i>North Africa</i>
8.	<i>Associate Professor</i>	<i>Middle East</i>
9.	<i>Student</i>	<i>Balkans</i>
10.	<i>Student</i>	<i>Sweden</i>
11.	<i>Student</i>	<i>Sweden</i>
12.	<i>Student</i>	<i>Central Europe</i>
13.	<i>Student</i>	<i>Sweden</i>
14.	<i>Student</i>	<i>South-East Asia</i>
15.	<i>Associate Professor</i>	<i>Sweden</i>
16.	<i>Student</i>	<i>Sweden</i>

Study 5

Research objective: The aim of my fifth study was to explore and build a joint understanding of social justice HCI to highlight the opportunities of genuine commitment to the concept and to prevent misaligned approaches and short-term engagement.

Data collection method: To capture the vital literature in the growing field of social justice HCI, my co-author and I worked with a scoping review in order to present a broad overview of the concept. We conducted a keyword search to create a literature corpus for analysis and elicited a number of criteria to refine our corpus (*see Table 6*).

Analysis: To analyze the papers of our final corpus, we developed a scheme of guiding questions. At the start there were 144 proceedings, which after the criteria became 60.

Methodological reflection: This theoretical paper was written as a way to summarize all the knowledge on social justice that I had collected through the years and contribute to the HCI community. The scoping review as opposed to a larger literature review allowed me and my co-author to explore the concept more freely based on questions. This is as opposed to working exhaustively.

Table 6: Overview of selection process from Paper 5.

Selection	No. of proceedings
<i>Keyword search for (“social justice”) in the ACM guide to computing literature</i>	<i>150 proceedings (6 not accessible)</i>
<i>Criteria 1: Does the paper engage with the concept of social justice beyond the keyword and references?</i>	<i>Yes: 56 proceedings Borderline: 17 proceedings No: 71 proceedings</i>
<i>Final corpus</i>	<i>60 proceedings</i>

Study 6

Research objective: The sixth study of this dissertation directly critiques overtly designing interpersonal safety technologies for gendered violence.

Data collection method: My co-author and I collected a handful of HCI papers that presented either wearables or apps claiming to solve public gendered violence for women.

Analysis: We conducted a critical analysis through the four domains of power originally articulated by Patricia Hill Collins in her book *Black Feminist Thought* (P. H. Collins, 2000). Through the four domains, we discussed at what level of intervention each paper directed their main contributions so as to highlight the high number of papers directed at interpersonal change.

Methodological reflection: For this paper, it was the submission format that made it possible to collect papers and shape the methodological approach in such an open way. While the literature in the study was not collected in an exhaustive way, we could through just a small sample make our main points and highlight the pitfalls of overtly designing for interpersonal change.

Table 7: Overview of selection criteria for papers included in the article.

Selection	No. of papers selected
<i>HCI papers that in some way designed digital artifacts for women to protect themselves from public gendered violence</i>	<i>20 papers</i>

Table 7: Overview of methodological details from Papers 1–6.

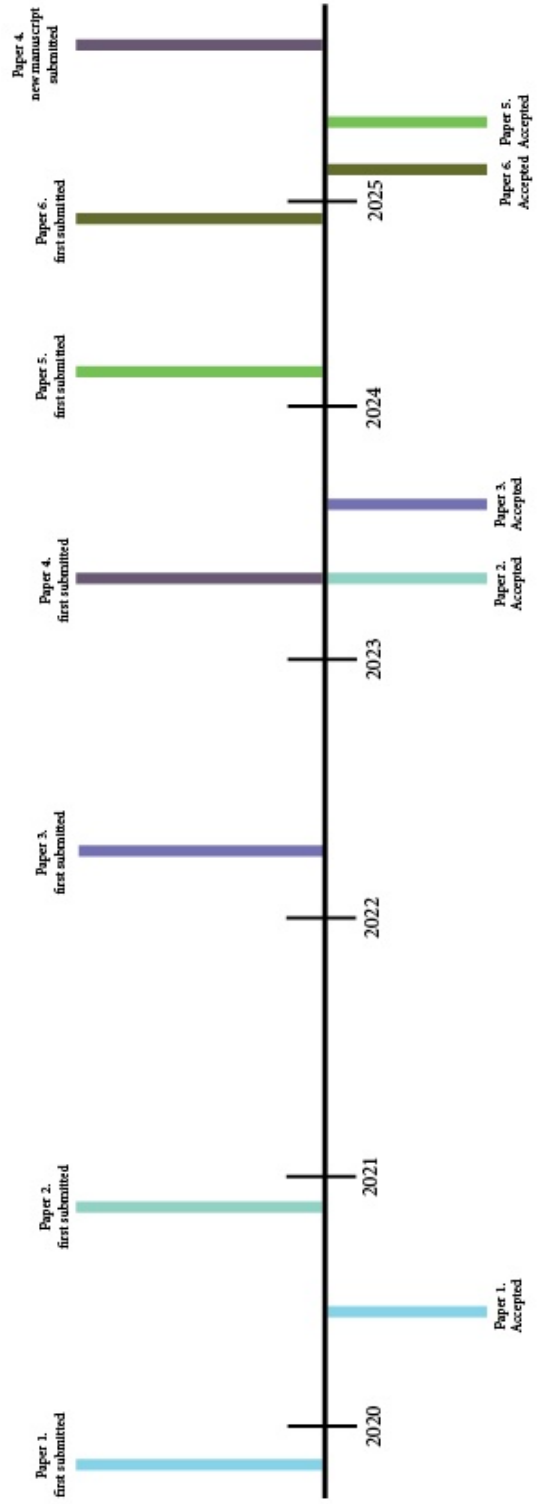
<i>Study</i>	<i>Data collection method</i>	<i>Sampling method</i>	<i>Data</i>	<i>Type of analysis</i>
<i>Study 1</i>	<i>Semi-structured interviews</i>	<i>Purposive sampling</i>	<i>12 participants</i>	<i>Thematic analysis</i>
<i>Study 2</i>	<i>Semi-structured interviews</i>	<i>Snowball sampling</i>	<i>15 total 11 women 3 men</i>	<i>Thematic analysis</i>
<i>Study 3</i>	<i>Semi-structured interviews</i>	<i>Purposive sampling</i>	<i>6 women</i>	<i>Thematic analysis</i>
<i>Study 4</i>	<i>Qualitative surveys Semi-structured interviews</i>	<i>Purposive sampling</i>	<i>Survey: 23 women Interviews: 16 women</i>	<i>Thematic analysis</i>
<i>Study 5</i>	<i>Scoping literature review</i>	<i>Two main criteria</i>	<i>60 papers</i>	<i>6 guiding questions</i>
<i>Study 6</i>	<i>Collection of papers</i>	<i>Criteria</i>	<i>10 papers</i>	<i>Critical analysis through the four domains of power</i>

Summarizing reflections

As you might have noticed in my descriptions of the studies, despite using some of the most common methods such as interviews and surveys, participant recruitment and data collection was not always easy and straightforward. Occasionally, such as in Studies 3 and 4, I had to re-evaluate my initial ideas of data collection to better fit the individuals I was trying to reach. Taken collectively, the studies in this thesis have given me many possibilities to become a better and more reflexive researcher when exploring injustice and systemic issues.

Image 1: Overview of research processes, From initially submitted to accepted for publication.

- Paper 1 - Designing a Digital Archive for Indigenous People
- Paper 2 - A Social Justice-Oriented Perspective on Older Adults Technology Use in HCI
- Paper 3 - Mapping the Digital Injustices of Technology-Facilitated Sex Trafficking
- Paper 4 - Supporting Independent Paths to Sexual Violence Justice in Socio-Technical Systems
- Paper 5 - Social Justice in HCI: Current Streams, Considerations and Ways Forward
- Paper 6 - The Safest Woman Alive



Chapter 5 – Summary of studies and papers

This chapter presents the papers that form the foundation of this dissertation. Firstly, I provide a small summary of how the study came to be. Then I present the aim and background of the study. Lastly, I summarize the results and contributions.

Study 1 – Digital Access to Sámi Cultural Heritage

The aim of the Digital Access to Sámi Cultural Heritage project was to explore and build a large digital portal with material collected from widespread sources mostly in the Sápmi area to create easier access to cultural heritage in Sámi communities. Since the Sápmi land crosses several northern countries – Norway, Sweden, Finland and Russia – and much cultural material has been scattered through centuries of forced displacement, collecting large volumes of material is challenging. The digital archive would be the first of its kind to include material from all over Europe and be a collaborative effort over the country borders of Sápmi (except Russia). I came into the project in the later half to conduct interviews and be part of the Swedish UX design team in testing and developing the prototype, which would later successfully become the final website, Nuhotti. The interdisciplinary and cross-border collaboration between members of the project created a strong foundation for the archive to be actualized. This study, and the following publication (Paper 1) shows an adequate starting point for my academic journey in exploring the opportunities of using a social justice research approach when seeking to address systemic oppression in HCI.

Paper 1

Moradi, F., Öhlund, L., Nordin, H., & Wiberg, M. (2020, October). Designing a Digital Archive for Indigenous people: Understanding the Double Sensitivity of Design. In *Proceedings of the 11th Nordic Conference on Human-Computer interaction: Shaping Experiences, Shaping Society* (pp. 1–11)

Aim and background

The aim of the paper was to report on the design and evaluation of a prototype version for the larger cultural heritage archive – which in the end became the website Nuhotti. The paper further presents our proposed notion of a “double sensitivity” in which cultural and design sensitivities are attended to as part of designing for Indigenous groups. In the paper, we report the (at the time) lack of studies in HCI and design research focusing on designing for Indigenous communities and an even further lack of literature attaining to archives for cultural heritage. From this gap, we positioned our own design process and worked towards a digital archive for Sámi cultural heritage.

Results and contributions

From our empirical data collection, we presented four features from which we gained important insights, which we referred to as codes. The first code dealt with the overall tonality of our prototype design, such as the feel and look of it. The second code related to usability, as the Sámi participants had themselves been allowed to explore and navigate throughout the prototype. The third code reported on the sociability features and on what level archival members should have the possibility to, for example, share, comment and like a post. The last and final code reported on ethical considerations for the archive and included discussions on how to present archive users with important values and cultural sensitivities.

The two final codes revealed to us in the team that while designing with good intentions, because of historical and ongoing discrimination and marginalization of the Sámi people, some features of the archive would probably be misused to harm them. This was pointed out by many participants, who argued that any type of commenting feature would most likely be misused to spread hateful language and would demand much moderation.

From the results, we moved to shape our insights into the model, which we called the “double sensitivity of design.” We argued that by having sensitivities towards the group in which we were building an archive for, it would to a higher extent be appreciated and used by that community. We contextualized our contributions not only from the paper but from the entirety of the project towards design research and the HCI community through our insights on designing for sensitive settings and Indigenous groups.

Study 2 – Older Adults Technology Use During Covid-19

For my first own empirical study, I set out to explore how older adults from ages 65+ used and felt about technology during COVID-19, a very unusual time in their lives. In Sweden, during the height of the pandemic, older adults were strongly recommended to restrict their personal and social interactions so as to decrease the risk of infection. This meant that many older adults had started to turn to more digital ways of communicating and socializing. I first started out with the idea of discussing the use of technology and feelings about using it more during the pandemic with older adults. However, as the first interviews were conducted, it became more and more apparent that many were not happy with the general push towards a more digital society in Sweden. Many of the participants not only felt left out because of their current situation in a pandemic world but had even previously experienced how more and more opportunities were disappearing due to newer digital options. It was from these discussions that I shaped Paper 2, from initially only exploring the use of technology by older adults during COVID-19 to instead leading me to focus on the collateral damage of Swedish digitalization.

Paper 2

Öhlund, L. (2023, July). A Social Justice-Oriented Perspective on Older Adults' Technology Use in HCI: Three Opportunities for Societal Inclusion. In *International Conference on Human-Computer Interaction* (pp. 519–532). Cham: Springer Nature Switzerland.

Aim and background

The aim of the paper was hence to highlight the need for incorporating societal factors (as opposed to individual) into research about older adults and technology use in HCI. In the background, I discussed different framings common in research with older adults in HCI such as capabilities, adoption, acceptance, how technology is often framed as economically positive for older adults, and how ageism and stigma are important to acknowledge. As described above, through my initial exploration of older adults' technology use in HCI, I quickly came to realize that my interest in social justice was highly relevant for this study.

Results and contributions

Study results highlight perspectives from the participants dealing with the importance of technology when it comes to living a rich and qualitative life as the majority of them could not imagine life without it. Another result highlighted how the fast-paced technological developments in Sweden, despite being done with good intentions, had caused some participants to feel frustrated and isolated. For this paper, I brought in a social justice-oriented perspective to highlight important opportunities that arise when we move beyond personal characteristics of technology use, economic growth through technology and ageist arguments.

I argued that HCI researchers had opportunities to address the negative effects arising from the fast-paced technology growth in Swedish society instead of trying to solve issues for older adults with more technology. Secondly, I discussed the need for analogue social services in conjunction with technological so as to not exclude those who did not wish to go completely digital. Lastly, I highlighted the importance of seeking to dismantle ageism in society.

Study 3 – Technology-Facilitated Sex Trafficking

The original aim of this study was to explore how and in what ways sex traffickers (ab)use technology to recruit, trick, organize and administrate victims of the unfortunately growing business. I started with recruiting and interviewing individuals who my co-researcher and I agreed would potentially have extensive experience working with questions of human trafficking and abuse. Since I was still relatively new in my role as a PhD student, I did not see it fit to conduct research directly with victim-survivors of sex trafficking and instead we turned to, for example, women's shelter personnel, police officers and personnel from anti-trafficking NGOs. Through their perspectives, we soon realized that the way in which the Swedish government understands sex work greatly affects any potential technological interventions. We therefore reshaped the following paper to better recognize how legal frameworks of sex work can shape and be shaped by technological anti-trafficking efforts by authorities and aid organizations.

Paper 3

Öhlund, L., & Almeida, T. (2023, August). Mapping the Digital Injustices of Technology-Facilitated Sex Trafficking. In *IFIP Conference on Human-Computer Interaction* (pp. 523–527). Cham: Springer Nature Switzerland.

Aim and background

The paper begins by addressing how the fast growth of technology has made anti-trafficking efforts by aid organizations and authorities more difficult and complicated. We discuss how the growth of online abuse websites streamlined with digital payment options are often very hard to track and stop. Moreover, we discuss how more abstract lines of sex work, such as sugar dating and escorting, are often romanticized through social media. After establishing the complexity and growth of novel technological abuse, we bring in arguments regarding how legal frameworks, government models and politics intertwine with efforts to intervene in sex trafficking. For this short paper, we used the Swedish, or Nordic, model of sex work, which understands any woman, man or gender non-conforming person selling sex as a *victim* and any person purchasing sexual services as a *criminal*. By doing this, we noted how technological interventions for the Swedish society can differ from, for example, the US, where it is illegal to both sell and buy sexual services or from the Netherlands, where both are legal.

Results and contributions

We argued that technological interventions for anti-trafficking efforts can run in tension with national and local socio-political frameworks. To avoid this tension, we highlighted a series of risk-mitigating approaches. We firstly discussed legislation of social media abuse as one of the major ways in which to prevent technology-facilitated sex trafficking and asked how we as HCI researchers can address issues of a socio-political nature and push for change. Secondly, we discussed the difficulty of designing artifacts which can to a large extent be misused by abusers and questioned how we can design to prevent future misuse while stopping ongoing digital abuse. Lastly, we brought in a larger discussion on capitalistic notions in technology production, which we argued is important when questioning how to demand tech companies prevent known technology-facilitated sex trafficking despite potential loss of revenue.

All in all, as technology-facilitated sex trafficking proliferates through the misuse and abuse of socio-technical systems, we brought in

considerations towards HCI researchers, aid organizations and authorities trying to stifle this growth and discussed how to understand legal models of sex work so as to not reproduce harmful practices of systemic oppression.

Study 4 – Exploring Digitally Paths to Justice

From the beginning of my PhD, I had wanted to conduct a study that would center on sexual violence as part of gender-based violence to highlight the relevance and opportunities of support through digital technology. I wanted to work directly with women who had experience of some type of abuse to focus on their perspectives and feelings. Because of this, I had to start by compiling an ethical application in which various questions on risks and opportunities had to be evaluated. This process took about four months from starting the application to getting it approved. As I discussed in Chapter 4, Methodological framings, I originally struggled to find participants for my interviews. After changing the data collection to initially feature a qualitative survey, I was then able to more easily find participants to interview.

I positioned this study in accordance with growing HCI literature framing the complexities of patriarchal violence in different parts of the world. I argued that this study contributed to that discourse by not only talking directly with women who had these experiences but also by exploring how their perspectives could inform HCI research seeking to address the complex scope of gendered violence and sexual abuse. From the two-part data collection consisting of 25 survey answers and 16 interviews, my co-author and I moved to analyze the material and to start writing a first paper.

Paper 4

Technological Pathways Towards Justice and Change:
Exploring digital support and socio-political structures of gendered violence with victim-survivors of sexual abuse
Linnea Öhlund, Rikard Harr
Submitted to journal

Aim and background

The purpose of this study was to explore how digital technology could support independent paths to justice for women with experience of sexual

violence while also discussing needed socio-political change to address gendered violence. The background discussed the special case of sexual abuse as it set itself apart from other types of gendered violence in line with feminist arguments. My co-author and I elicited a social justice perspective to 1) support victim-survivors in their own path to justice and 2) discuss needed socio-political change to address gendered violence. To contextualize our results we moreover used the four domains of power from Patricia Hill Collins to contextualize how our results can be used to shape HCI initiatives for socio-political change to address gendered violence.

Results and contributions

Through our first data collection, we analyzed the material and found three themes which then served as the basis for creating the interview questions and format. These themes were: i) perspectives on justice ii) feelings of fear, guilt and stigma, and iii) the complexity of understanding sexual abuse. These themes determined how we shaped the questions for the interviews while also having to adhere to the frame of the approved ethical application.

From our thematic analysis of the interviews, we summarized four themes: 1) Sexual Violence Aftermath, 2) Sexual Violence Justice, 3) Sexual Violence Support and 4) Sexual Violence Prevention. The first theme, sexual violence aftermath, revolved around internal and external feelings of stigma and guilt as an inherent part of sexual violence. What many participants reported was how the aftermath of sexual violence, in how they were treated by others, became a large part of the trauma. The second theme, sexual violence justice, centered on how legal justice was very difficult and complex to obtain and many felt worried about how efforts to report sexual violence would not be worth it. The third theme, sexual violence support, included discussions on the importance of community and support after sexual violence as a part of the recovery and justice process. The last theme, sexual violence prevention, revolved around discussions on both personal ways of avoiding sexual violence and on large-scale social change, which participants felt was needed.

In the discussion, we moved to discuss how digital technology could support women in their own paths to justice in a multitude of ways centering on our different themes. We then came back to the four domains of power to discuss how digital technology could also support adjacently needed socio-political change along the different domains.

This study contributed to HCI research on injustice and systemic issues in HCI and highlighted the readiness of support for independent paths to justice for women with experience of sexual violence as part of gendered violence and sexist structures. In parallel, we also contributed to the social justice HCI discourse as we used the four domains of power to show how digital support could be shaped along various social domains in society.

Study 5 – Social Justice Streams

As I had worked with social justice as my main concept from 2020 forward, I had during this time collected and read much of the research available in HCI on this topic. Through this collection and interest, I had over the years realized that, despite the popularity of the subject, no coherent understanding of social justice had been established. I wanted to write something that would substantially discuss social justice as a concept to employ when addressing systemic oppression in HCI. In collaboration with my supervisor, we set out to conduct a scoping literature review on the growing social justice HCI field and to discuss the growth of the topic during the last 15 years. This resulted in the fourth paper.

Paper 5

Öhlund, L., & Wiberg, M. (2025, March) Social Justice in HCI: Current Streams, Considerations and Ways Forward. *Interacting with Computers*, iwaf009.

Aim and background

The overall aim was to further a cohesive, yet fluid understanding of how social justice is shaped and understood within HCI so as to build and strengthen our research community. We wrote a first manuscript in early 2024 and sent it to the journal *Interacting with Computers*. The paper begins by describing the growth of more critical perspectives considering larger socio-political structures in issues of a systemic nature in HCI. It also sets out to describe the importance of discussing a common understanding of social justice so as to counteract misuse and misunderstanding of the concept. We initially introduce social justice as it has grown in HCI over the last 15 years and pinpoint the most influential papers in the area. To create a cohesive understanding of the growing concept, we sought to conduct a scoping review of literature of a social justice nature.

Results and contributions

We argued that social justice is still a growing area, and our results should be seen as a guide or an overview rather than a static answer to what social justice is. To strengthen the collective research discourse of social justice in HCI and to frame long-term contributions, we suggested five considerations: 1) Consider articulating how and what social justice means for your particular research context, 2) Consider who are at the end of the social injustice you are attending to in your research, 3) Consider what theory or framework you are using to position social justice as a large socially critical concept, 4) Consider how you position the end goal of your research – are you implying heightened consumption and production of products?, and 5) Consider how your work can be continuously built on in order to frame long-term commitment to social justice. Finally, we argue that this paper contributes to the ongoing growth of social justice research in HCI.

Study 6 – Critiquing Interpersonal Safety Technologies

During a research visit in Newcastle in 2024 with Angelika Strohmayer, I held a presentation about my work on social justice in HCI. One of the main points of the presentation was that while many HCI researchers have started to address large injustices and systemic issues, when it came to gendered violence, it was common to frame wearable gadgets or alarm buttons instead of, for example, framing larger questions of socio-political structures. This literature then created overt attention to push women to change their behavior so as to avoid public gendered violence. We started discussing if the concerns of the presentation could be turned into a paper that would further open the conversation on technological solutionism into HCI.

Paper 6
The Safest Woman Alive: A Reflection on Interpersonal Safety Technologies for Gendered Violence Protection Linnea Öhlund, Angelika Strohmayer Extended abstract To be published in: Alt-CHI-2025

Aim and background

This paper begins with a prologue of a woman getting dressed to go out for a walk. To feel safe, she has been told over and over again that she needs to use a plethora of personal safety technologies designed and reported on by HCI researchers. Through the prologue, it becomes obvious that piling on technologies is an absurd way of having to live just to go outdoors. The background of the paper centers in on the misplaced attention in HCI towards designing and creating technologies for women having to protect themselves from something which is inherently not their fault. In the paper, we bring in the matrix of domination as first developed by Patricia Hill Collins so as to discuss the different levels in which gender violence can exist. We also highlight the complexities and pitfalls of designing for gendered violence as an interpersonal problem, and as a normative problem.

Results and contributions

Through our prologue and conversations, we come back to the four domains of power to contextualize how different levels of social practices organize oppression of gendered violence. We argue that HCI researchers and designers can use the framework to analyze their potential gendered violence interventions so as to avoid misaligned, shortsighted, solutionist or victim-blaming tendencies of digital technologies. We bring in nuanced and reflective discussions on how good intentions of technology are not enough to create and develop them (because they might reproduce harm). We moreover scrutinize academic pitfalls because the strong publishing force in academia can sometimes mean that tangible objects such as interpersonal safety technologies are favored at conferences over more theoretical contributions. Lastly, we discuss how gendered violence is a bigger problem than what HCI can fix but that we are readily available to support in change.

The paper contributes to ongoing research on social justice in HCI where socio-critical perspectives including both external and internal critique are of importance so as to not reproduce harmful results. This paper specifically does so through the context and discussion on gendered violence prevention through socio-technical systems.

Chapter 6 – Discussion

At the start of this dissertation, I addressed a gap in the growing HCI literature on injustice, pointing to the need for sensitivities towards the influence of systemic oppression on socio-technical systems so as to not reproduce harmful practices towards marginalized communities. From this gap, I positioned the aim of this thesis to understand and address the influence of systemic oppression on socio-technical systems for marginalized communities.

Through the background, I highlighted a growth in HCI centered on more socio-critical perspectives and the potential digital technology holds in aspects of change and intervention. Thirdly, I positioned the theoretical framing within social justice HCI and presented four values shaping the papers and content of this dissertation. In the methodology, I highlighted the most common approaches when working with questions of injustice and marginalization within HCI and the social justice discourse. I then proceeded to present the methodological approaches and details for the papers of this dissertation. The background, aim, result and contributions of the papers were presented in the paper summaries.

Finally, in the following chapter I will start by answering my research question, divided into two parts.

- How can HCI researchers *understand* and *address* systemic oppression in socio-technical systems

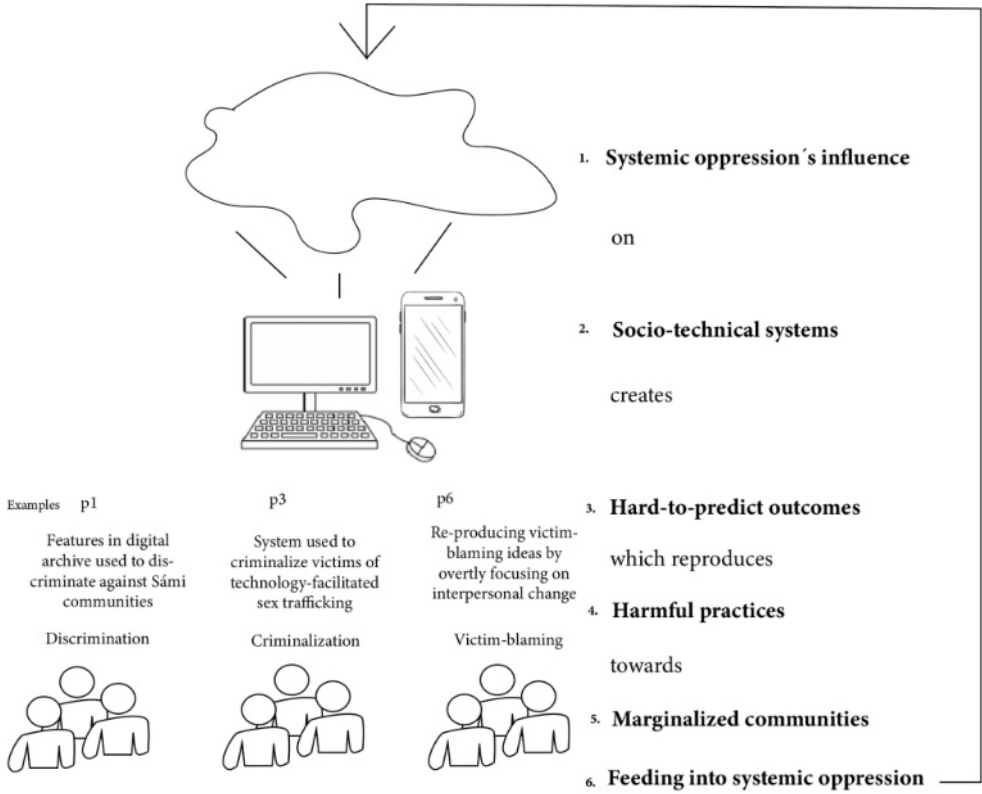
In answering the research question, I then move to discuss three understandings: i) good intentions only go so far, ii) all research on systemic oppression is political, and iii) technological solutions can't solve injustice. Taken together, they form three understandings on how to be sensitive towards the harm-reproduction loop and support researchers in addressing hard-to-predict outcomes and mitigating harmful practices.

Answering the research question

HCI researchers can *understand* systemic oppression as something that influences socio-technical systems and creates hard-to-predict outcomes. Such hard-to-predict outcomes can, for example, be abusive language towards Sámi communities (P1), ageist rhetorics towards older adults (P2), re-victimization towards victims of technology-facilitated sex

trafficking (P3), forcing women with experience of sexual abuse towards unwanted stigma, (P4) and lastly reproducing victim-blaming ideas through interpersonal technologies (P6). These hard-to-predict outcomes then reproduce harmful practices such as discrimination (P1), ageism (P2), criminalization (P3), stigmatization (P4) and victimization (P6). The outcomes and harmful practices ultimately feed back into systemic oppression, creating what I call the harm-reproduction loop (see Figure 1).

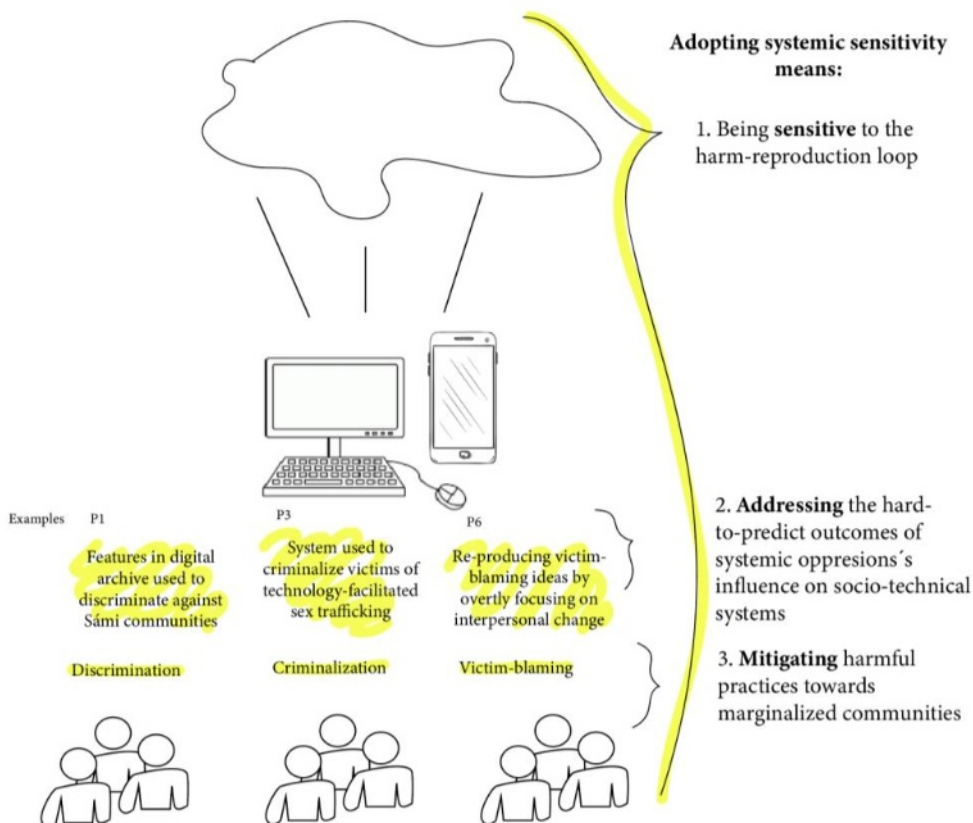
Figure 1: The harm-reproduction loop.



To then *address* and mitigate the harm-reproduction loop, I propose *systemic sensitivity* (see Figure 2).

Systemic sensitivity is a theoretical lens supporting HCI researchers in being *sensitive* to the harm-reproduction loop, and *addressing* the hard-to-predict outcomes so as to *mitigate* the harmful practices towards marginalized communities (see Figure 2). Adopting systemic sensitivity means actively working to not reproduce harmful practices feeding into systemic oppression.

Figure 2: Overview of adopting systemic sensitivity.



I propose systemic sensitivity to HCI researchers working with injustice and systemic issues to frame larger opportunities of socio-political change and long-term contributions towards marginalized communities. Questions concerning injustice, systemic issues and marginalized communities are part of a growing movement in HCI, and systemic sensitivity is a lens that will help us to collectively move beyond the harm-reproduction loop and towards more equitable futures.

As systemic sensitivity is the main contribution of this thesis, three other insights have come from working with questions concerning injustice and systemic issues over the years. These insights are: i) good intentions only go so far, ii) all research on systemic oppression is political, and iii) technological solutions can't solve injustice. Researchers in HCI working with questions concerning injustice and systemic issues will at some point face these same insights and consider them to move forward in a research process.

Good intentions only go so far

In the beginning of this dissertation, I presented the growing interest in HCI attending to topics of injustice and issues of a systemic nature – an area called social justice. By providing an overview of the area and how it has grown, I highlighted how topics of injustice such as, for example, racism (Erete et al., 2021, 2022; L. Irani et al., 2010; Ogbonnaya-Ogburu et al., 2020), gendered violence (Bellini, 2023; Bellini et al., 2019; Dimond, 2011; Strohmayer et al., 2017), sexual abuse (Ahmed, 2019; Andalibi et al., 2018; Sultana et al., 2022) and economic inequality (Corbett & Loukissas, 2019; Ekbia & Nardi, 2016) have become more common in HCI literature.

When working with questions of injustice and systemic issues, it is important to understand how the harm-reproduction loop mean that researchers can unintentionally reproduce harmful practices towards marginalized communities. As the empirical findings of my papers show various types of the harm-reproduction loop, some papers revealed how good intentions are not enough to mitigate the loop. For example, in P1, a design feature could have rendered more stigma against the Sámi community, in P2 suggesting more technology to solve aging would be to reproduce marginalization against older adults and in P3 the overt attention towards personal change in cases of public sexual violence would render victim-blaming ideas – despite good intentions.

This type of recognition of good intentions and how they are not enough to create systems that are not affected by systemic oppression is also discussed by Sultana et al. (2018). They focus on initial ideas of wanting to design a digital artifact for women to use in their everyday lives, which could ultimately be a tool to fight conservative patriarchal structures. However, due to the complex and abstract nature of sexism and patriarchy in their case study, they realize that such a tool would have led to negative

consequences for the women in which they were originally trying to support – despite the best of intentions.

Moreover, (Rankin et al., 2021) describes how their computer science colleagues can become complicit in marginalizing certain communities despite the best intentions not to do so. This is because they do not sufficiently analyze their own power and privilege. When working with marginalized communities and in the case of (Rankin et al., 2021) with the concept of intersectionality, good intentions are not enough to protect our research from inherent assumptions stemming from our lack of analysis.

Similarly to Sultana et al. (2018) and (Rankin et al., 2021) my research team and I recognized the risks of reproducing harmful practices during our research process in **Paper 1**. When working together with Indigenous communities, it became evidently clear that because of systemic oppression towards the Sámi people, socio-technical systems of today are often used to reproduce harmful practices such as abusive language and discrimination on social media. This can also be seen in literature regarding other marginalized communities such as Strohmayer et al. (2019a) and Bellini (2023).

While we had an initial idea to have users of the heritage archive do an easy quiz so to highlight important sensitivities to the material, some Sámi participants reported on features being “too dumb and easy.” They thought it looked like the quiz was written by a non-Sámi person wanting to do things right (interestingly, the quiz questions were written by ME, a non-Sámi person wanting to do things right).

We moreover discussed with our participants the potential to include features to comment and share material. However, several participants quickly made us aware that any such feature would be used for harassment towards Sámi communities. If we were to implement such a feature, we would have to have strong moderation, something we did not consider before. While our intentions were certainly good from the beginning, they were not enough to shield from the hard-to-predict outcomes of systemic oppression, and we could have reproduced harmful practices towards the Sámi community.

Similarly, in **Paper 2**, as HCI researchers work to support older adults with various issues such as isolation and health monitoring, we must be sensitive so as to not create socio-technical systems that perpetuate ageism. In the background of this paper, I noted a growing interest in HCI focusing on digital technology for older adults. However, when discussing

with participants, it became clear that by always suggesting technological solutions for various age-related issues, we also alienate those who do not use technology. This is quite a complex issue since we as computing researchers often inherently work to create technology. However, this study showed that the massive amount of technology had instead narrowed down the opportunities of social services for many older adults. Once again, this shows that good intentions will not protect from harmful practices of systemic oppression, in this case ageism.

Lastly, I would like to discuss how good intentions are not enough in relation to **Paper 6**. In the paper, my co-author and I highlight the risks of continuously creating personal safety technologies to prevent public gender violence against women and gender non-conforming individuals. In this paper, we directly critique the overt focus in HCI to design technologies for potential victim-survivors to protect themselves from situations which are inherently not their fault. By continuously creating, for example rings, apps, sensors, necklaces, belts and watches for women to wear in potential situations of danger (often positioned simply as “being outside”), too little focus is placed on the real structural changes that are needed in cases of gendered violence. Of course, we recognize that HCI researchers designing for protection against gendered violence always do so with the best intentions, but overtly prompting personal change means inevitably reproducing harmful practices such as victim-blaming ideas towards women and gender non-conforming individuals.

In summary, creating and designing with good intentions is important, and I recognize how most HCI research, specifically within a social justice discourse, is always conducted to help or support individuals and communities. However, while we might often think that good intentions are enough to make sure the socio-technical systems we create do not reproduce harmful practices, I argue that good intentions only go so far. Because of the complex and abstract nature of systemic oppression creating hard-to-predict outcomes, we cannot assume that good intentions protect us from reproducing harmful practices against marginalized communities, which I have discussed in this section. Instead, we must consider actively working to address hard-to-predict outcomes to mitigate harmful practices reproduced through socio-technical systems.

All research on systemic oppression is political

As HCI moves towards a larger scope of research attending to injustice towards marginalized communities, it becomes important to address how socio-political structures are a big part of systemic oppression. In my empirical work, this can be seen in, for example, P1 when discussing the systemic discrimination against the Sámi communities, P2 when discussing older adults' exclusion from social opportunities, in P3 when discussing how legal models of sex work interfere with efforts to stop technology-facilitated sex trafficking, in P4 when discussing sexual violence as part of patriarchal oppression, and in P6 when discussing victim-blaming rhetorics from HCI research. These discussions are all inherently political and could not be separated from the studies.

This connection between politics and oppression can be seen in HCI literature attending to marginalization (Björgvinsson et al., 2012; Sharma, Bray, et al., 2023), colonialization (L. Irani et al., 2010; Oliveira & Martins, n.d.), and gentrification (Corbett & Loukissas, 2019). What unifies this type of research is that it does not shy away from acknowledging how researching these topics is inherently political.

Especially when working directly with marginalized communities and topics of injustice, we cannot muddle the fact that marginalization and systemic issues come from political structures – current and historical. This is also echoed by, for example, Erete et al. (2023), Ogbonnaya-Ogburu et al. (2020) and Sharma et al. (2023). If we pretend that the socio-technical systems we are creating will not be a part of or be affected by socio-political structures, we are going to overlook how they might reproduce harmful practices. Moreover, researchers will occasionally have to make potentially political decisions to protect our participants. For Strohmayer et al. (2019a), this meant ruling out the creation of a novel socio-technical system as it could have been used to criminalize participants although it might have been preferred by the government in that context.

Building on these arguments, in **Paper 3** we highlight that any socio-technical intervention towards technology-facilitated sex trafficking should be sensitive to the legal settings and socio-political context of the country of implementation. This is because the systems we create not only risk becoming misused by traffickers, which we highlight in the paper, but also misused by governments to, for example, criminalize and victimize individuals in sex work. If researchers understand that socio-technical systems created to stifle technology-facilitated sex trafficking can result in

even greater harmful practices because of socio-political structures, we can to a better extent mitigate such harmful practices.

This type of recognition of political context can also be noted in **Paper 1**, where we discuss the historical and ongoing discrimination against Sámi communities. Without considering how the Swedish government through legal and political measures has systematically discriminated against the Sámi people, we are actively rendering the perspectives of many invisible, and hence contributing to political marginalization.

Moreover, in **Paper 2** when discussing how HCI research often positions technological development for older adults as inherently positive, it became apparent how many participants felt that the digitalization in Sweden was political. These feelings were connected to force and stigma when older adults did not want to use technology. When not engaging in technology, participants felt that the general view in Swedish society both by the government and companies was that they had themselves were to blame for the negative consequences arising. What I was seeing the need for in my study was not another means to force older adults into using technology because most of them were already using and appreciating it. Instead, what I found an extensive need for was a larger understanding in both HCI research and Swedish society that older adults should not be forced into technology use. Not creating more technology and instead critiquing current digital opportunities not fit for older adults is political.

Lastly, I want to discuss **Paper 4** and **Paper 6** as they both relate to gendered violence – a highly political topic. Because of the damaging nature of sexual violence and the stigma many women experience when reporting abuse, they occasionally prefer other types of justice. This could mean working in parallel with the type of justice offered by the government. This type of turn away from only centering on legal justice is common in HCI literature, where legal options towards justice might elicit more violence (see, e.g., Ahmed, 2019; Rabaan, 2021; Sultana et al., 2022). For **Paper 4**, I worked closely with my participants to explore not only direct options for justice supported by socio-technical systems, but also relevant socio-political changes needed.

Lastly, in **Paper 6**, my co-author and I argue that by overtly suggesting personal safety technologies for women, researchers are reproducing harmful and victimizing practices. By making women responsible for their own protection against something that is practically impossible to protect from, we are cementing sexist structures. By recognizing how public sexual violence is part of larger gendered violence structures and the

importance of addressing the root issues on a socio-political level, we can mitigate such harmful practices.

When working with issues of systemic oppression and marginalized communities, we cannot do so without considering being political. This is because oppression and, for example, marginalization inherently exist because of politics, political ideas, decisions, frameworks, and legal models, whether now or earlier in history. Disregarding those facts would mean that we might miss the hard-to-predict outcomes of systemic oppression's influence on socio-technical systems.

Technological solutions can't solve injustice

Finally, I wish to highlight an insight I have positioned in many of my papers – that technology cannot and will not be the single solution to any major injustice. This is an important understanding when adopting systemic sensitivity and can be noted empirically in P2 when acknowledging how technology cannot solve aging, in P3 when discussing how technology cannot solve technology-facilitated sex trafficking, and in P6 when discussing how technological safety systems won't solve public sexual violence against women and gender non-confirmative individuals.

While it may seem obvious that an app or a system cannot solve, for example, sexism, many times in HCI we aim for our contributions to solve challenges that are just a small part of larger systemic issues. Similar arguments can be seen in Dombrowski et al. (2016) and Bellini et al. (2022), where the researchers are more broadly articulating that we have to alter our research approaches to better promote changes, interventions or support instead of solutions. This is because, as I have mentioned before, systemic oppression cannot be dismantled through technology. If we instead look to what is actually possible by, for example, strengthening already existing tools as in Strohmayer et al. (2019a), building support mechanisms for justice as in Sultana et al. (2022), conducting internal discussions on how to frame anti-colonialism and antiracism as in Irani et al. (2010) or Erete et al. (2022), we are working towards more long-term change and not only focusing unrealistic solutions.

Parallel conversations can be noted in **Paper 2**, where much of the background for the study came to be about how HCI research often positions technological development for older adults as inherently positive. While many older adults followed along in the digital change, many also felt that the digitalization rendered them isolated and excluded

from, for example, social services they had access to before. Instead of sufficiently addressing how the very implementation of technology had created harmful practices against older adults, officials and companies proceeded to digitize their services.

While we might think that more technological artifacts can solve the issues older adults who doesn't use technology have, we are wrong. By forcing, and continuously reproducing, arguments on why older adults' lives will be better with technology, we are creating and cementing ideas that those who do not wish to use technology are bad for not doing so. More technology cannot solve the issues that have arisen from implementing technological opportunities to the point that analogue opportunities vanish.

The third paper (**P3**) of this thesis also discusses how technology cannot solve technology-facilitated sex trafficking. This is because the nature of the crime is too complex and scattered to even begin solving it. Instead, HCI researchers need be sensitive to the larger socio-political changes needed; otherwise, technology-facilitated sex trafficking will only continue to grow.

The sixth paper (**P6**) in my thesis focuses specifically on the challenges and pitfalls of designing for personal safety. We argue that when we continuously design and create wearables or apps that women are supposed to use to protect themselves from sexual violence, we are reproducing ideas that women are responsible for their own protection from a crime in which they have no real potential to prevent. This is highlighted through the prologue of the paper, which shows the absurdity of constantly designing tangible artifacts and apps for women to use for their own protection. No matter how many personal safety technologies a woman owns, gendered violence will still exist. By instead turning our attention towards the root causes of gendered violence and highlighting on what levels socio-technical interventions can be aimed, we showcase other opportunities of interventions apart from technological solutions.

What I highlight through this third insight of systemic sensitivity is the importance of considering moving away from positioning technology as a solution to injustice and systemic oppression. Through Papers 2, 3 and 6, I discuss the importance of considering this insight by highlighting the pitfalls of solutionism and the bigger opportunities for long-term contributions when examining the root cause of systemic oppression.

So, to summarize, when adopting systemic sensitivity as a theoretical lens when working with questions of injustice and systemic issues – whether before, during or after conducting research – we will at some point have to consider how i) good intentions only go so far, ii) all research on systemic oppression is political, and iii) technological solutions can't solve injustice.

What systemic sensitivity can and cannot do

As I have discussed, systemic sensitivity is a theoretical lens I suggest HCI researchers working with questions on injustice and systemic issues apply so as to not reproduce harmful practices towards marginalized communities.

As systemic sensitivity is a theoretical lens, it is quite open for interpretation within its given frames. This could be considered positive and, in similarity to working within social justice, something that opens up for growth and adaptations. However, it could also be up for critique much like other critical theories too abstract to adopt.

While there are ways noticeable in my papers related to, for example, methodological approaches and methods of data collection that could be taken as practical implications of systemic sensitivity, I merely wish to frame it as a lens for now. Framing systemic sensitivity as a theoretical lens opens for broader adoption and ways to use it in congruence with other theories, such as feminist and critical race theory.

While systemic sensitivity is meant to support researchers in addressing hard-to-predict outcomes and mitigating harmful practices, the lens does not give any guarantees. Even when adopting its considerations, i) good intentions only go so far, ii) all research on systemic oppression is political, and iii) technology cannot solve injustice, we can never be sure no harm will be done. Perhaps some would then say that we should not work with marginalized communities or questions of injustice so as to be sure we will never reproduce any harmful practices. I argue this would instead be even more detrimental to marginalized communities. Especially in the socio-political climate of today, more and more groups risk being subjected to harmful practices such as discrimination, stigma, marginalization and even violence. This is not only noticeable in the country in which I wrote this dissertation and where most of my studies' participants live, but in many other nations around the world as well.

While adopting systemic sensitivity does not provide any recipes or guarantees to positive socio-political change, an increased understanding and knowledge on ways forward could potentially pave the way for change.

The socio-technical systems we create will, whether we like it or not, be part of growing injustice and inequity. However, through the contributions of this dissertation, I have worked to highlight the need for collective research efforts in HCI towards justice – for all.

Conclusions – For now

I began this dissertation stating that while technology becomes a bigger part of people's lives it also becomes a tool to facilitate systemic oppression towards communities who face marginalization.

To address these issues, HCI research has begun to address questions of injustice and systemic issues. However, without being sensitive to the complex and abstract nature of systemic oppression, we might end up reproducing harm towards those communities we are trying to support.

The aim of this dissertation was thus to support HCI researchers in understanding and addressing the influence of systemic oppression on socio-technical systems towards marginalized communities. To meet this aim, I asked the following research question:

- How can HCI researchers understand and address systemic oppression in socio-technical systems?

In the background chapter, I showed how the HCI field has to a larger extent begun to engage in socio-critical perspectives through a discourse called social justice.

I then moved to position this thesis within social justice by presenting and discussing four values present in social justice HCI, which all of the included papers of this dissertation adhere to.

In the methodological chapter, I showed how most work within the social justice area is conducted through interviews and in close cooperation with participants. In doing this, I also went through the methodological approaches and data collection methods for the papers included in this dissertation while offering a methodological reflection for every paper.

In the summary of studies, I presented the six papers foregrounding the contributions of this thesis to give an overview of the aim, background, results and contributions.

To answer the research question, I firstly argued that we could understand systemic oppression's influence on socio-technical systems as something that creates hard-to-predict-outcomes, which reproduces harmful practices towards marginalization. This process happens through a

process I call the harm-reproduction loop. To then address and mitigate these harmful practices, I suggest a theoretical lens called systemic sensitivity, which supports researchers to actively work against the harm-reproduction loop, address the hard-to-predict outcomes and mitigate harmful practices.

I moreover discussed three insights from my empirical work: i) good intentions only go so far, ii) all research on systemic oppression is political, and iii) technology cannot solve injustice. Researchers in HCI working with questions concerning injustice and systemic issues will at some point face these insights and have to consider them to move forward with their work.

Moving forward

All in all, what can we learn from this dissertation and the papers it builds on? Through the background, theoretical chapter and papers included in this thesis, we can see the clearly growing interest in HCI in addressing larger and complex injustice and systemic issues. Through this growth, an area called social justice has emerged to readily tackle and better analyze the pitfalls and opportunities of addressing systemic issues through socio-technical systems. While social justice is still a growing area and discourse in HCI, which can be noted specifically in my fifth paper, I have argued that we must still be sensitive to the potential harmful practices we might reproduce through our research.

What this dissertation then represents in this movement forward is a way to support researchers in exploring and addressing complex injustices and systemic issues – without further reproducing harm. What I then hope anyone reading this dissertation can take with them is how socio-technical systems will not and cannot solve injustice. However, socio-technical systems can definitely support efforts of justice. These are two vital differences that takes us from solutionist and capitalistic ideas on technology to more sustainable and long-term chances for socio-political change.

Moreover, this dissertation and its included papers have been written during a time period between 2020 and 2025. In those five years, much has happened in the world. From the lockdown during COVID-19 to the ongoing wars in Ukraine and Palestine, I have never in my lifetime experienced such a massive polarization as right now.

But what I learned growing up in the Swedish north, descended from a long line of factory workers, is that everyone deserves respect, opportunities and basic human rights. This should not be a privilege, but a right. As you might understand, this dissertation and its papers have been a way for me to work towards those initial ideals I was taught. While systemic sensitivity does not give any grants to directly help or change society, I argue it is one step in the right direction towards more just futures – for all.

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Designing a Digital Archive for Indigenous People

1

Understanding the Double Sensitivity of Design

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Designing a Digital Archive for Indigenous People

Understanding the Double Sensitivity of Design

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ABSTRACT

In this paper we present our work on the design and evaluation of a web-based digital archive. The aim of this research project was to explore ways of enabling easy access to materials about their cultural heritage for indigenous people. In this project we worked in close collaboration with the Sami people across brainstorming sessions, design workshops, prototype development, and user tests. During this process we became aware of two intertwined sensitivities, i.e. a cultural sensitivity and a design sensitivity - and we refer to this as a “double sensitivity”. The data recorded from the interviews and the participants’ interaction with the prototype were analyzed using thematic analysis as the methodological approach. Our results pointed at five main code clusters including: tonality of the design, usability, sociability, ethical considerations and technical errors. In this paper we discuss these findings, and we suggest that our results, and the proposed notion of “double sensitivity” contributes important research on human computer interaction (HCI) design for indigenous people.

CCS CONCEPTS

• **Human-centered computing**; • **Human computer interaction (HCI)**; • **Empirical studies in HCI**;

KEYWORDS

Cultural sensitivity, design sensitivity, digital archive, indigenous people

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1 INTRODUCTION

There is a growing body of research in the field of HCI on design for indigenous people (see e.g. Coenraad 2019; Lawrence 2017, 2019; Peters 2018; Russel 2015). While the cultural and historical dimensions of this work are acknowledged [1] less is known about the design of digital technologies aimed at reflecting the core of indigenous cultures’ interactions with design processes (including design efforts to reflect materials that symbolize and communicate their history, norms, values, rituals and cultural practices). In this paper we present the results of a project aimed at addressing this issue through the design of such digital solutions for indigenous people. At the project level, we explored the design of a web-based digital archive for the Sámi people located in the far north of Scandinavia.

Web-based digital archives are typically built on top of databases to provide access to collections [2]. However, finding media in these archives can be difficult [3]. To address this design challenge, we worked in close collaboration with our target users, and strove to implement functionality that would improve media searching based on searches, filters and shared collections.

Our efforts were focused on designing a web-based digital archive that enabled easy access to collections that reflected the users’ cultural and historical heritage. During the development of the digital archive, we noticed that our design process demanded a “double sensitivity”. In this paper we present this notion of “double sensitivity”, and we describe how we carried out our design research in relation to those sensitivities. We also present a model that illustrates how the two sensitivities are intertwined. At a methodological level, we suggest that this “double sensitivity” comprises 1) having a “cultural sensitivity” in relation to the indigenous people, and 2) having a “design sensitivity” in terms of the design proposals developed.

The paper is structured as follows. First, we present the background and other work related to our project. In this section we focus on existing research on digital archives, digital cultural heritage, and design for indigenous people. We also review the existing literature on cultural and design sensitivity. Second, having outlined the strands of existing related work, we present our project on designing a digital archive for the Sámi people. We present the project, our design efforts, and the user study we conducted. We also report on how we dealt with culturally rooted design challenges, and how we worked with this “double sensitivity” to acknowledge and appreciate the particular context we were designing for. Third, we

present the results from the user study. Fourth, based on the results, we present our proposed generalized “double sensitivity” model, which illustrates how cultural sensitivity needs to be entwined with design sensitivity to make the final product both functionally and culturally sound for its intended use. Here we illustrate how we have worked back and forth between the conceptual notion of “double sensitivity” and our design case where these two sensitivities were practiced. Finally, we present our conclusions, their implications and suggestions for moving forward.

2 BACKGROUND & RELATED WORK

Our project derived inspiration from prior work involving physical and digital archives, ethical considerations in researching and designing for indigenous groups, and ethical encounters in HCI research and design

2.1 The Sámi culture

Following The indigenous population of Sápmi, which includes Norway, Sweden, Finland and parts of Russia are complex to define. A modern definition of who a Sámi person is can be related both to geography (living in a Sámi area) and family (born in a Sámi family or having Sámi relatives) but in this day and age there are many definitions of who a Sámi person. A person can be both Sámi and for example Swedish. Earlier laws stated that a person who makes a living of reindeer herding is a Sámi, but this is not true any longer and now anyone with geographical or family bond can identify as Sámi [48].

2.2 Physical & Digital Archives

According to Merriam Webster, Archive, by definition, means “a place in which public records or historical material (such as documents) are preserved or a repository or collection especially of information.” Archives are used to investigate various historical contexts, such as medical records, colonial studies and public records [4]. Archives are therefore important institutions that shape our memories [3]. Archives are considered to be a repository of historical sources, and archivists are assumed to be neutral and objective. However, there are a number of researchers that believe that archival documents, institutions and systems do have a tacit narrative that provides meaning to a particular archive [5].

Advances in digital technologies have made drastic changes in the design and development of modern archives. Since the early 2000s more and more archive institutions and newspapers have digitized their resources. Despite this, however, still only a fraction of archival sources has been digitized, and in some countries, such as Sweden and Finland, this is estimated to be only 5 percent. Digital archives are known as platforms that preserve information in a way that can be (re-)discovered, accessed and presented at any time in the future [6]. There are many studies investigating how to develop digital archive platforms for longer and better preservation of the archive materials and their increased use [6] [7]. However, many researchers believe that merely developing a digital platform for preserving archival sources is not enough, and a visual interface for digital archives is necessary to increase the accessibility of such platforms [8]. In a study conducted by Hong et al. it was evident that interface design is an important factor influencing the use of

digital archives, and thus the quality of interface design is important in order to promote digital archive usage [9]. Many researchers have evaluated digital and online archives [10] [11], resulting in different guidelines in terms of designing easy access digital archives, such as browsing the archives with minimum mouse clicks, the importance of simple browsing and avoiding downloadable viewers [11]. Digital Archives in relation to indigenous populations can be found in various countries and research suggest that it can be of great importance and complexity to design for [59]. In the field of HCI, various designs of digital archives have been explored, such as the use of autonomous sites in preserving data [2], adopting reflective design [12], interactive systems that foster face to face conversation and story sharing spatial interaction using objects as a way of embodying storytelling [3], and ubiquitous computing and multimedia designs [14]. The design of digital archives and the potential contribution of heritage practice to HCI were explored specifically at a CHI workshop in 2012 [15]. As citizen participation plays a vital role in restoring and preserving cultural heritage, some researchers have explored social platforms that encourage people to act as skilled storytellers by creating personalized stories and sharing them with friends, associates and professionals [16].

2.3 Ethical Considerations in Researching for Indigenous Groups

Since the first HCI ethical guidelines were written by Wendy Mackay in 1995, much has changed [31]. In 1995, research involving video was new to the field, and Mackay specifically focused on writing about those challenges. Since the mid-1990s, new tools and techniques for conducting research in novel areas have been developed, which is reflected in the way we generate and understand knowledge in HCI.

As new technologies increasingly pervade various aspects of our life, our attitude towards what methods to use and how to construct knowledge shifts. Thus, ethical considerations are becoming a key issue for HCI researchers in different contexts [32-36]. In particular, as new technologies are designed and evaluated for vulnerable and marginalized participants, HCI researchers face ethical dilemmas that are highly contextual and very difficult to plan for in advance [33] [58]. Working in these sensitive contexts creates challenges known as ‘situational ethics’, referring to ethical considerations that emerge while conducting research [37]. However, situational ethics also provide the opportunity to improve ethical review processes by incorporating the new understanding gained from interacting with the context. Therefore, questions such as how HCI research should be conducted and what our common values are as a research community are being addressed by a number of researchers.

Although the majority of these reflections and discussions happen within informal venues, some researchers have published their ethical considerations of different contexts, such as studying animals in HCI [35], and exploring the impacts of town hall-style meetings [32]. Brown et al., have presented five proposals regarding how HCI research should be conducted ethically [36]. In their second proposal, Brown and his team focus on conducting research with vulnerable populations. Their proposal insists that “rather than focus on harm we might instead ask who benefits: Is it just the researchers?”. They suggest that interventions with vulnerable

populations must result in greater benefits for those populations than the researchers [36]. Applying this approach led to our design using double sensitivity for a digital archive that is responsive to the sensitivities of the culture and translates them into design sensitivities. In section 4 we further discuss the full meaning of cultural and design sensitivities. Focusing on these sensitivities from the outset resulted in a platform design that was the most beneficial for the Sámi community.

In going through the existing body of published research we were surprised by the lack of studies focused on design for indigenous people, and in particular the lack of studies aimed at documenting work on the design of digital archives for these user groups. In relation to this existing gap in the literature we see our work as a contribution in how it offers some initial results on this particular topic.

3 DIGISÀMI: DESIGNING A DIGITAL ARCHIVE FOR THE SÀMI PEOPLE

The work reported in this paper is a part of a large-scale research program with the primary aim of exploring new technological solutions for the Sámi people. Accordingly, the research program covers web-based solutions and also mobile technologies to enable flexible support across the geographical areas that the Sámi people travel every year. Currently, material regarding the Sámi cultural heritage can be found in several archives and collections, which for historical reasons have been stored in museums and collections across the Nordic countries but also in Europe.

The design process for the digital archive was therefore developed with a diverse user group in mind. The project was, for instance, financed by a program aimed at strengthening the collaboration between Norway, Finland, Sweden and Sámi, and it was therefore crucial that the end product was accessible to all those areas. The results of this project will not only contribute to contemporary and future design research, but will also result in an interactive and published digital archive. Within this digital archive there will be archival material supported by established archive institutions. These institutions aspire to promote their archive material to as wide a target group as possible, which had to be considered in the design.

According to Mikaelsson (2016), the Sámi peoples' lands and territories are linked to their existence and survival. He states, "We (Sámi) are the land and the land is us; we have a distinct spiritual and material relationship with our lands" [21]. Discrimination and exploitation in relation to Sámi people are ongoing in Sweden today, and conducting research about this topic is legitimate and ethical from a Sámi perspective [17]. Because of discrimination and exploitation, there is a need for the Sámi people to demonstrate their existence [38]. Within the Sámi community there are, however, different views on whether or not Sámi history should be made available for a wider audience. Some are proud of it, while others are against marking cultural historical settlements on a map because this is contrary to traditional Sámi culture [38].

How does one design a digital archive with aspects such as these in mind? A digital archive is about storing cultural and historical material and making them easily accessible. This raises both a design challenge and an ethical challenge in this particular context.

Accordingly, the next section covers the methodology applied in this project with an emphasis on these challenges.

4 METHODOLOGICAL FRAMEWORK

A good contextual understanding is crucial when designing any system [39], but particularly so when designing for indigenous groups. We wanted to design a digital archive that was not only easy to access and use but included features that were aligned with the specific characteristics of the Sámi cultural heritage and values.

As a group of researchers where none of us was an expert on Sámi culture, we had a massive responsibility. As stated earlier concerning the design of digital archives, it was evident that the majority of the existing digital archives had been designed based on a western epistemology and a western definition of cultural heritage. Designing for sensitive indigenous groups required a different approach. We needed to be sensitive in relation to who we were designing for ("cultural sensitivity") as well as how our design could reflect those needs ("design sensitivity"). Accordingly, we had to work with a "double sensitivity", as outlined below.

"*Cultural sensitivity*": we had to understand the sensitive setting within which our research was placed, being aware of the cultural sensitivities of the Sámi culture. Understanding the cultural sensitivities played a crucial role in determining which values within the community could be represented in the design in the form of features, functionalities and overall layout.

"*Design sensitivity*": the design had to be considerate in relation to the cultural values it was intended to support, and in relation to how it could be adapted further to encompass cultural values. This sensitivity included how to address cultural values in the form of appropriate design features and how those features could be adopted by the intended users and the community at large.

In order for us to be aware of these sensitivities, we decided to adopt a "user sensitive inclusive design", approach, as suggested by Newell and Gregor [40]. In order to have a design that is inclusive of sensitivities, the designers need to develop an empathy with the users instead of merely relying on guidelines or lists of requirements. Replacing the word centered with sensitive in "user centered inclusive design" means, according to Newell and Gregor [40], highlighting the fact that it can be hard, if not impossible, to design a product that is accessible and appreciated by all potential users. Being sensitive means being aware of this fact and then trying to achieve something more obtainable, which is inclusive design. This approach has been widely used in designs for elderly people and users with specific challenges [41-43]. In developing the double sensitivity framework, we followed the established tradition in HCI and Participatory Design research to integrate different aspects of sensibilities when working with user groups and design for users. In particular we were inspired by the early work by Friedman [49] on value-sensitive design, and how that perspective has been further developed by Le Dantec et al. [51] and Borning and Muller [50]. We were also inspired by Participatory Design research, in particular Muller and Kuhn [53] and the work by Merritt and Stolterman [55] on cultural hybridity in participatory design, and how that perspective has been applied in similar studies in Namibia by Katjivirue [54].

With these two sensitivities as our guiding framework, we strove to establish a close relationship with the Sámi community to provide the context and foundation for the design project. In doing so we sought to increase our knowledge base as much as we could by reading various resources about the Sámi culture, and participating in Sámi events, including the so-called “Sámi week”. We visited the Sámi museum frequently to learn more about their history and culture, and we took part in the Sámi film festival in 2019. We even took part in Sámi cookery classes to become familiar with the taste of Sámi food and to learn more about their culture. As well as these activities, we held a set of informal interviews with a number of people within the Sámi community from diverse backgrounds. Those informal conversations had a massive impact on our understanding of the cultural sensitivities: they helped us grasp the cultural norms and values of Sámi culture, and generated ideas about how we could translate them into our design process, and what that implied for the design of a digital archive that could support our particular context.

4.1 Empirical Case Study

Guided by our methodological framework, we carried out a preliminary study, designing and evaluating a web-based digital archive aimed at supporting easy access to materials that reflected Sámi cultural and historical heritage. This prototype shared many features of typical archival web-based digital material. However, because we were aware of the cultural sensitivities, we decided to design features that were mapped to those cultural sensitivities while simultaneously adopting a design-sensitive approach. Below we present this prototype, focusing on three of those features, and then we describe the user study that followed.

4.1.1 Prototype. Our digital archive design shares many features with other online archive websites, including: 1) standard search filters, 2) visual research, 3) login functionality, 4) standard filters to sort the results, and 5) different types of archival material (see figure 1a). In addition to these standard features there are also certain features that were specifically designed to address the “double sensitivity”. The three main features are: a) a map, b) a community function that includes the collections, user contributions and stories (although parts of this feature, such as the “stories”, were not fully implemented in the prototype, the icon in the top right corner did result in interesting discussions with some of the participants) and c) ethics, which presented a novel way of designing the ethical guidelines of the archive with double sensitivity in mind. In the following section we will discuss these three main features in further detail. Below, we present three of our “designed features that use double sensitivity”, and the design process for each.

The Map: During our informal interviews we asked many different questions about their relationship with their Sámi heritage. We also relied on open-ended questions, e.g. “what are the main characteristics of being a Sámi according to you?”, which often resulted in interesting discussions. All of the interviewees mentioned the importance of Sámi land for those belonging to the Sámi culture. In some of the discussions we noticed a desire for a decolonized archive and map. This cultural sensitivity resulted in a feature designed so that geographical borders in the map are options that can

be added or removed (see figure 1. b). We provided the border filter as an option for the users in the interests of our broad target group.

The community: We also noticed that many of the Sámi communities were interested in researching their family trees and stories related to their ancestors, and related to the fact that the community is an important entity among the Sámi [23, 44] we created the community aspect. This feature included the possibility of creating a personal profile, uploading archival material, creating personal collections and following other popular collections, commenting on material, and liking comments.

This requirement was very evident from the way the Sámi younger generation use social media such as Pinterest to share their “Duodji” art. Another example was how Sámi participants in the cookery classes were specifically interested in family recipes. The idea of providing a platform for users to make communities within the overall community is a good example of the features we included in our web-based digital archive using “double sensitivity” in mind: understanding the cultural sensitivity of the community and translating that into a design feature. Such a feature is a great compromise for digital archives designed for indigenous cultures. Indigenous cultures are very effective at preserving their heritage orally, as stories that are told face to face, often with no written trace [45]. Depending on the stories, some are for the general public to hear, while others are only for selective audiences. Therefore, trust is an important aspect in these cultures.

Applying “double sensitivity”, we designed the feature so that when you create a profile you can select who you want to share your uploaded material with: just yourself, just those who are following your collections, or with everyone. These features build on the idea that a community can be enriched by private stories told in combination with the material presented in the archive. By being able to add personal material or personal stories it is possible to create an archive that is not only filled with material from governments and other institutions but to have a social archive that is constantly changing and evolving with the help of the individual users.

4.2 Design Process

Overall, we spent more than six months conducting background research into understanding the Sámi culture, reflecting on the “cultural sensitivities” and thinking about how they could be translated into “design sensitives”. In order to obtain further knowledge about the “double sensitivity” related to our archive, including material presenting Sámi cultural heritage, we initiated our design process by holding a variety of events including multiple brainstorming sessions, workshops and weekly meetings and discussions among the design team. During these six months we organized three larger workshops with representatives for the Sami people, the designers and the Sami archives. These sessions were conducted in parallel with our research into the “cultural sensitivities”, so we were able to discuss the design of features that would be in line with those sensitivities. Thus, the opinions of many were taken into consideration, both in relation to the cultural aspects of the archive and the functional design, and the meaning that the features would hold for different groups. Early sketches of the three main features were created in accordance with these “cultural and design sensitivities”

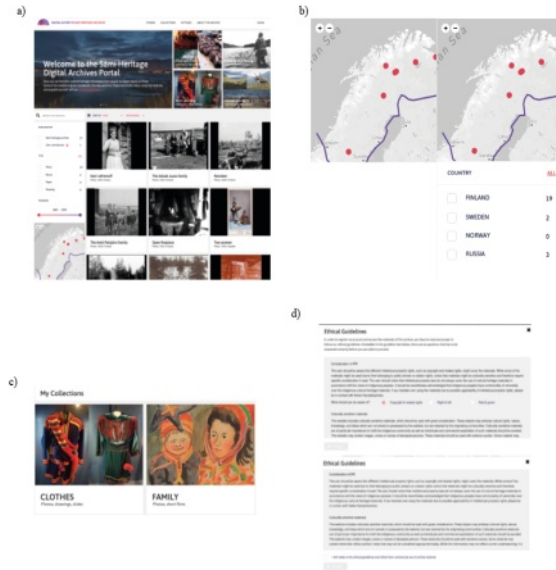


Figure 1: Captions of the prototype and its features. a) The first page of prototype, b) The feature of the map incorporating “double sensitivity” means that border filters are optional, c) The community – a user’s collection, d) Ethics: versions of the ethical guidelines with and without questions

that were designed in one of the early brainstorming sessions, are presented in figure 2. Overall, we had to work with iterations that involved interactions with the Sámi people, design work, demos, sketches and workshops. We worked back and forth – in order to be sensitive to our users, and in relation to what we designed for this user group. The outcome was our web-based digital design. As seen in figure 1a, it shares many features with other platforms, such as search functions and timeline filters. However, as already mentioned, there are other features designed specifically as a result of the “double sensitivity” approach taken by our project.

4.3 User study

We carried out a user study of our web-based digital archive in February and March 2020, comprised of three parts: two interviews and one prototype navigation. The first interview was conducted in order to establish what knowledge the users had about both Sámi culture and archives. Participants then navigated around the prototype. The aim of this part of the user study was to evaluate the general feel of the prototype, specifically the “double sensitivity” features. Initially the participants were asked to navigate the prototype by themselves, in order to get the “look and feel” of it. They were then given different scenarios and tasks to perform. The participants were able to hear instructions from the researcher via the software, and the researchers were able to see the screen and hear the participants. With the participants’ consent, their voices and the screen were recorded. In order to ascertain the participants’

thoughts on the process, they were asked to conduct the navigation using the think-aloud method [46].

After the evaluation, the participants were invited back for a second interview to explore their experience of the prototype. This interview consisted of questions focusing mainly on their overall opinions relating to their personal experiences with either Sámi culture or archives, as well as more detailed aspects and features of the prototype. Anything that came up during the first interview or trial navigation was followed up during this interview.

4.3.1 Participants. In order to establish a good basis for the study, some parameters were established to incorporate both a rich dataset of material and a broad target group for the web-based digital archive. In total we interviewed 12 participants, three from each specific category (see table 1). These categories were created before the user study to make sure that the participants encompassed different experiences across different fields, thus enabling the essential aim of the user tests. The main categories were knowledge about Sámi culture and knowledge about archives. Knowledge about Sámi culture would include individuals who were themselves a part of the Sámi community and or had great knowledge of the community, this could for example be phd-students writing about a certain part of the Sámi culture. Individuals that was part of the knowledge about archives group where individuals who had extensive knowledge about archives, both physical and digital. Examples of individuals within this group was archivists, students and phd-students who all had used archives for research purposes during



Figure 2: An example of some sketches made during the brainstorming session

Table 1: Distribution of participants in the user study

	Knowledge about the Sámi culture	Limited knowledge about the Sámi culture
Experience and knowledge of archives	Group 1. 3 participants (3 Female) (2 originally from Sámi community)	Group 2. 3 participants (3 Male)
Limited experience and knowledge with archives	Group 3. 3 Participants (2 Male & 1 Female) (2 originally from Sámi community)	Group 4. 3 participants (2 Male & 1 female)

many years. Individuals that was part of the group of no-sami nor no-archive knowledge was not a part of the Sami community, nor had any further knowledge of it, and they did not have much experience with any type of archives. All of the individuals within this last group was students from different fields. A table over the user groups are given in table 1

5 RESULTS

The data recorded from the interviews and the participants' interaction with the prototype were analyzed using thematic analysis as the methodological approach [47]. Five main code clusters were identified: tonality of the design, usability, sociability, ethical considerations and finally technical errors. The code technical errors merely focused on technical issues and glitches with the prototype, and we will not expand on this code further here. In the following sections we present the results from the four other codes.

5.1 Tonality of design

Some questions were raised and opinions expressed regarding the overall design and look and feel of the prototype. They included

color use, placement of certain elements, phrasing of certain words and other design-related aspects. The code tonality of design was created to collate all the opinions regarding design. Some participants were positive about the general look and feel of the prototype. Participant 2 said "It generally felt nice, I don't know in what way but it felt nicer and more sympathetic". Participant 7 was also positive and said "The prototype feels more designed than a conventional archive". Some participants felt that the accessibility of the prototype was good and that they could also understand what the limitations were. Participant 9 said "I grasped better what could be done in this (prototype) just by looking at it". Participant 8 also mentioned this, "I understand what the prototype can give me".

5.2 Usability concerns

The code usability refers to any comment, question or issue raised by the participants in regard to the usability aspects of the prototype. This code was then divided into two subcodes:

The first one called usability Context encompassed comments that were more focused on the context of the archive. These were

Table 2: Table over participants and their level of knowledge in regards to archives and Sámi culture

Participant no.	User group	Knowledge about Sámi culture	Knowledge about archives
1.	Group 2.	Limited knowledge	Has extensive knowledge of both physical and digital archives through studies.
2.	Group 3.	Identifies as a Sámi	Limited knowledge
3.	Group 4.	Limited knowledge	Limited knowledge
4.	Group 4.	Limited knowledge	Limited knowledge
5.	Group 1.	Identifies as a Sámi and studies Sámi culture	Has extensive knowledge of both physical and digital archives through studies.
6.	Group 1	Identifies as a Sámi and works with Sámi culture	Has extensive knowledge of both physical and digital archives through studies.
7.	Group 2.	Limited knowledge	Has extensive knowledge of both physical and digital archives through studies.
8.	Group 1.	Studies Sámi culture	Has extensive knowledge of both physical and digital archives through studies.
9.	Group 4.	Limited knowledge	Limited knowledge
10.	Group 3.	Identifies as a Sámi	Limited knowledge
11.	Group 2.	Limited knowledge	Has extensive knowledge of both physical and digital archives through studies.
12	Group 3.	Grew up in a predominantly Sámi area and claims to have large second hand knowledge	Limited knowledge

more common among those participants who had more experience of archives.

The second one called Usability Functionality encompassed comments that covered general aspects of usability, such as adding a specific button.

In going through the usability concerns we were inspired by the work by Díaz et al [56] on cultural-oriented usability heuristics in order to link aspects of usability to the particular cultural context in focus.

Many of the researchers and participants with archival knowledge would comment that context was a very important feature to them. The Usability Context code was applicable to various responses made by different participants. For example, participant 11 explicitly mentioned “I want to have the volumes in front of me when I open the boxes (in physical archives) and when I go to a digital archive I want the same thing”. Many similar comments were made by a number of the participants in relation to any digital archive, not just our web-based digital archive.

Given that we were aiming for a minimalistic design for our prototype, we decided to avoid some archival technical features, for example identifying the organization from which the material came. Although this minimalistic design was appreciated by the non-professional participants, those participants who had extensive experience of archives felt that this feature resulted in a lack of context.

Additionally, a large number of participants mentioned struggling to get a feeling of context when using a digital archive. All of the participants with knowledge of archives said that the best aspect of physical archives was the context provided by seeing, smelling and feeling the material. However, the more positive aspects of having a digital archive are availability and searchability. As participant 5 said about physical archives, “you feel the material, you have the sense of feel and touch of the material, and you have the smell. When you work on a computer you only have the visual, and also when it comes to the visual, I would say that it is one thing to see the document on a web page and another thing to see it in real life.”

The part of the archive that included a map where participants could navigate to various geographical locations also generated comments that were coded as usability. The map was presented with two different designs, one contained country or border filters, where users could see the Sámi countries, while the other design did not contain the same filters and users had to navigate dots on the map in order to find a certain geographical location. Opinions on this were many. Some participants said that for them the map was more usable with the country filters, because they did not have any detailed knowledge of the borders and did not see any issues with having the borders there. This was expressed, for example, by participant 12: “The map would be confusing for a person with a non-Scandinavian background”. However, while some of the participants, such as

participant 1, appreciated the idea of the borderless map as a symbol of a borderless world, others highlighted the importance of raising this as an issue. For example, participant 11 mentioned that “The border issue can be a discussion he sees the point of having it this way although it is not an issue for me.” Most participants did not see why there would not be any borders or country filters, simply because for them it was easier to have them than to not have them. Participant 11 suggested that having the borders or countries merely depended on the user: “If a user knows about the borders, then they don’t have to be there but if a user doesn’t then the borders are better, it all depends on the user”.

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5.3 Sociability features

This code referred to comments, issues and questions raised by the participants in regard to the social aspects of the prototype, in particular the design of the sociability feature. Given the unconventional nature of this feature, opinions about the social or community side of the prototype were both positive and negative. Most participants discussed how hard they thought it would be to have a comments function in the archive. Allowing comments would mean having strong moderation to mitigate discriminating comments, and some participants discussed whether that would be possible or even worth it. Participant 12 felt that moderation would simply be too much: “I just don’t see it being worth it, it would be hard to moderate all the hate”. The majority of participants felt that even if there was extensive moderation and restrictions, the value of being able to share experiences and thoughts on the archive was greater than the possibly negative consequences.

In spite of this, the majority of the participants responded positively to being able to save images to private collections and expressed how useful they thought such a feature would be. Participant 8 liked the save feature, “I very much like the fact that I can

save the images like on Pinterest” and also felt like it would be useful to be able to comment and share the feature, “I would use the social aspect of the site, it would give value to my work”. Participant 5 felt the feature could bring a sense of community: “it was more like a community type of webpage, like this is for people interested in like Sámi photography”.

Only a few of the participants did not find this feature useful. Participant 2 preferred to use his own methods to save the material: “I can see why some might use it but for me I would rather use my own personal methods of saving and collecting the material”. Participant 4 also had a hard time seeing why this function would be good: “What is the point? I cannot see the point for myself, but perhaps for elders it would be good”.

Overall the social aspect was positively received by the participants, even if some questions were raised, particularly about the commenting function because this would require significant moderation by the administrators of the archive.

5.4 Ethical considerations

Authors’ The code ethical considerations encompassed comments that were mostly directed towards the ethical guidelines and how the participants experienced this feature.

Reactions to the two different ways of presenting the ethical guidelines varied among the participants. The ethical guidelines of both the “normal” wall of text and the “quiz” version were appreciated by some and not liked so much by others. Participant 6 talked about the version with questions: “Most people won’t read the guidelines, and this will make me not want to join the archive”. Participant 2 also felt the questions were not a good idea: “The questions feel too easy and dumb, like the answers are given without any thought”. However, there were positive comments as well. Although some participants raised concerns, others liked the idea of having a new ethical guidelines solution. Participant 1 said, “It’s a good way for users to have to read the ethical guidelines, the questions are also good. Without questions I will not read guidelines”. Participant 3 also liked the design: “I like the design of the questions”.

Participant 7 questioned how the text of the ethical guidelines was written and said that it could possibly strengthen prejudice against the Sámi population. “The text is interesting; you need to talk to different Sámi-groups and not just the groups that the government defines as Sámi. The sentences can be seen as portraying us like victims”. This was because the phrasing of the text looked like it was written by a non-Sámi individual who wanted to create a helpful text. “This text looks like it was written by a non-Sámi person who wants to do things right.” Further, and regarding how images in the archive were named, participant 5 mentioned the ethics of naming places and individuals: “There are a lot of pictures of anonymous Sámi people, and it’s a good way (having comments) to name places, so it’s not just oh, random Sámi in a random mountain area, it’s a way to empower and to say, okay this is the place, it has a name and a person”.

This section has presented the highlights of the results generated by our user study. These results provided a means to uncover opinions about the features of the archive. The opinions expressed could then be summarized and translated into a model in order to show

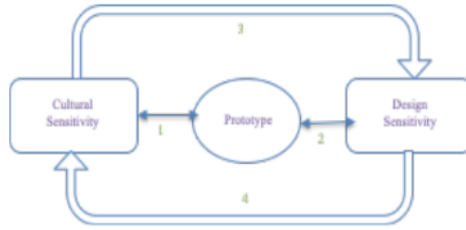


Figure 3: The “double sensitivity” model

how “double sensitivity” has benefited the design of this prototype and how this study has helped us understand “cultural sensitivity” better. In other words, the model illustrates how using “double sensitivity” can be beneficial in the design of prototypes such as this archive. In the next section we present the “double sensitivity” model followed by discussion on the overarching take-aways for HCI researchers and designers. technologies.

6 THE “DOUBLE SENSITIVITY” MODEL

Based on what we have described, the core of this research and study is to take account of sensitivity. This sensitivity is defined in two ways: “Cultural Sensitivity” and “Design Sensitivity”. Based on our empirical findings, and our design project conducted in close collaboration with the Sami people we propose that these two notions are fundamentally entangled. Accordingly, the model in figure 2 shows how taking a sensitive approach to a user group can result in the design of an archive that, in our case, can be appropriate and appreciated by the community. As illustrated in figure 3, the “double sensitivity” model consists of four parts.

1. “Cultural sensitivity” feeds back to the design of the prototype, so that, based on the knowledge gained by understanding the sensitivities within the culture, we can design features that are suitable for that culture. However, this is itself an iterative process that occurs during the design process.
2. “Design sensitivity” provides feedback to the prototype. During the design process several choices have to be made to implement the desired features. Design sensitivity is also an iterative process that modifies the prototype based on the context.
3. The more knowledge we have about the embedded cultural sensitivities, and the more time we spend learning about the context, the better we understand the “design sensitivities”.
4. Similarly, the more we know about the sensitivities within the design, the easier it is to identify the sensitivities of the culture. In other words, the prototype functions as a means to understand the “cultural sensitivities” better.

Stages 3 and 4 are considered to be feedback loops. Discussing our prototype with the Sámi community, and their realization of our cultural and design sensitivities, resulted in established trust between both sides. This trust resulted in engagement that in return

had an impact on our design. Therefore, the design of the archive and the user study both helped us shape our sensitivity in designing for the Sámi community.

7 DISCUSSION

Authors This study has generated many interesting takeaways, both about sensitivity and with this the double sensitivity model which relating to our research. Being sensitive in an interaction design project is always challenging. We are supposed to understand things, but also have to change or introduce new things within the context we are trying to be sensitive about. There are many things that need to be taken into consideration in order to be sensitive - from understanding user needs, capabilities and values, to the project requirements, to aspects of how the system might support those needs, and how the design might redefine practice once it is implemented. From that perspective Interaction Design (IxD) is always about this need to be sensitive to the context, and about how the design works in relation to that particular context. However, while it is easy to state that one should always be sensitive about user needs, and the particular context in question, little has been published about how these sensitivities play out during the design process.

We explicitly departed from well-known aspects of HCI design research to make visible the sensitivities needed to design interactive systems successfully in relation to use contexts where such sensitivities are key issues. In our work we have made two such sensitivities visible, i.e. we applied the “double sensitivity” approach proposed in this paper. We will now reflect on these two sensitivities and its implications in relation towards our study.

“**Cultural sensitivity**” - By focusing on a context with clear needs, and important values to protect, we have in this project been able to make the importance of a “cultural sensitivity” visible. We worked with “cultural sensitivity” throughout the project - from the initial studies, to the ethics workshops, to the design work. As already mentioned, “cultural sensitivity” is about understanding the sensitive setting within which the research is situated, which for us was being aware of the cultural sensitivities within the Sámi culture that formed the basis of our research. In some examples individuals who identified as Sámi did not think that a number of features were a good idea, but non-Sámi individuals did, for example, the ethical guideline questions. This is an interesting result

and it points us to a number of possible conclusions. Either the questions of the feature are not fully developed, or the concept it-self needs work done. There is also the possibility that this “culturally sensitive” feature is un-necessarily sensitive as one Sámi-participant expressed that in reality people don’t like to read long texts and as a result the service will not be used despite the text being in good will. However, there are clear statements from representatives of the Sámi community that being generally sensitive around related aspects of the Sámi community is of utter importance. In this case it is possible that the effort of designing sensitively did not translate to the individual or that the feature demanded more iterations to translate better. Changing the current form of the feature may lead to other outcomes but this result also taps into a slightly larger question that requires further research: Is it possible to design sensitively to the point of exaggeration?

Implications: Having knowledge about “cultural sensitivities” can play a crucial role in preventing insensitive design features. It can also be of value within the community as it builds up trust in relation to a design project that might expose cultural values.

“**Design sensitivity**” is the second sensitivity we made visible in this project. This is about making design choices sensitively and being reflective about how the design relates to the context it is intended to support. We have demonstrated this in how we approached the implementation of the ethical guidelines, which was widely discussed by the participants showing large potential for its development. The general concept of the guidelines presented in this study was appreciated although it became clear that some of the details have to evolve in future research. We also made the collections visible through our web-based digital archive.

Implications: “Design sensitivity” comes with a responsibility for the designer. It is about both acknowledging the context, values and culture that the design is intended to support, and also making sure that this is reflected in the design. The proof lies in the making and, accordingly, someone’s “design sensitivity” needs to be evaluated by examining the design from that perspective.

As we have illustrated in our model (figure 3), these two sensitivities are fundamentally intertwined. Our sensitive understanding of context (“cultural sensitivity”) informs our design work, and our design reflects to what extent we have such “cultural sensitivity”. If the design corresponds with the “cultural sensitivity”, we can say that our design demonstrates a “design sensitivity” in how it acknowledges the context it is designed to support. While these two sensitivities are well-known aspects in HCI and participatory design research we suggest that the notion of “double sensitivity” might contribute to these two strands by providing a concept that underscores the importance of unifying these two strands in the process of HCI design research.[54]

As the results from the user study illustrate, we worked simultaneously with both of these two sensitivities as we moved back and forth between a sensibility for the user group, and a sensibility for how we designed for these users. In doing so we managed to acknowledge the culture, values and people we are designing for (“cultural sensitivity”), and our user study indicated that we also managed to reflect that in our design (a matter of “design sensitivity”). Accordingly, we see this model and the identified implications as important take-aways for designers who seek to explore interaction design for sensitive user groups. Further, we believe that

this model works in the context of designing digital solutions for sensitive contexts, and we suggest that a topic for future work could be applying this model to other projects and examining its wider applicability.

8 CONCLUSIONS

We have presented our work on the design and evaluation of a web-based digital archive. The aim of this research project was to explore ways of enabling easy access to materials about their cultural heritage for indigenous people. On a more specific level, we have reported on our ongoing project to provide the Sámi community with such a digital archive. On a more general level, we have focused on two sensitivities that we became aware of during our project. Through the design and evaluation of a prototype for the digital archive, we noticed how these two sensitivities were intertwined, and accordingly we refer to them as a “double sensitivity”. In addition, we have unpacked the notion of double sensitivity by 1) reviewing previous work on cultural and design sensitivity that situates our work within the established body of research, 2) illustrating how these two sensitivities are addressed in our project, and 3) presenting a “double sensitivity” model that conceptualizes the relationship between these two sensitivities. We suggest that this model could be useful as a framework for further design research, in particular when designing for indigenous people where there is a need to situate a “design sensitivity” in relation to cultural values. Our design approach is well-aligned with an interaction design agenda that builds upon participation, cultural sensitivity, and ethical considerations, and we suggest that this is a sensible way of moving forward.

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A Social Justice-Oriented Perspective on Older Adults Technology Use in HCI

Three Opportunities for Societal Inclusion

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2



A Social Justice-Oriented Perspective on Older Adults Technology Use in HCI

Three Opportunities for Societal Inclusion

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Abstract. There is a growing strand of research on social justice in HCI. While many contemporary HCI studies are being conducted and analyzed in a social justice context, still few studies examine how this plays out among older adults and their use of technology. In this paper, three streams of HCI and HCI-connected research are mapped out describing personal characteristics, economic benefits, and age-related vulnerability at the forefront of older adults' technology use. Through an empirical study and a social justice-oriented perspective, I establish how HCI research on older adults' technology use fails to include important societal factors and misses out on valuable insights such as how societal structures can affect senior's life and technology use. Contributions posit three opportunities into how a social justice-oriented perspective can benefit research regarding older adults' technology use in HCI.

Keywords: HCI · Social Justice · Older adults · Ageism

1 Introduction

Research on older adults technology use rarely discuss social injustice such as, pressure of technology use in society, isolation from society interlinked with technology and exclusion from social and private digital services (see: [9, 21, 29, 33]). Such partial perspectives could potentially lead to negative effects for older adults because they center personal shortcomings and misses out on valuable insights on how societal structures affect important parts of older adults lives [9, 29]. In some regards, older adults are perceived as a vulnerable group because of aspects related to aging, such as cognitive and/or physical decline [9, 21, 29]. This presumed vulnerability is usually explored in the context of personal characteristics, economic benefits, and age-related vulnerability [7, 21, 30]. Technology has massive potential to positively influence and affect the lives of older adult users by, for example, reducing isolation, supporting at-home independence, and inspiring creativity [17, 23, 32]. Research has moreover explored personal robotics, eldercare robotics, and acceptance models for technology use, aiming to create positive changes in the lives of older adults [1, 4, 6, 16, 31]. Although the topic of older adults technology use is much explored within HCI, little research has taken into consideration

societal structures such as pressure of technology use in society, isolation from society interlinked with technology, exclusion from social and private digital services, and how these structures can cause negative effects [29].

In this paper, We look beyond factors of personal characteristics, economic benefits, and age-related vulnerability within HCI and HCI-connected research to understand how societal structures can affect senior's life and technology use. We set out to explore the following research question: *What are the opportunities to incorporate societal factors of technology use affecting the lives of older adults?* Accordingly the, aim of this paper is to highlight the need Of incorporating societal factors in research about older adults and technology use in HCI. Moreover, societal factors is understood as large structural governmental laws or initiatives that affect the lives of our participants.

1.1 Social Justice in HCI

Social justice is a concept currently growing within HCI (See: [5, 10, 26, 27]). The concept aims to explore systemic societal structures interlinked with vulnerable groups of people. Notions such as power, privilege, access, and vulnerability are often discussed within the field [8, 11, 13, 26]. Social justice has come to emerge in HCI predominately in the last ten years, [18, 20, 21]. One of the most cited papers on social justice in HCI discusses design strategies for a social justice orientation in interaction design [8]. Dombrowski et. al [8] argues for an understanding of social justice as an orientation consisting of modes and sensitivities towards, e.g., marginalized voices and inequality. The paper takes a stance in political theorist H.P.P Lötters arguments about justice. Lötter discuss social justice as multidimensional and defines the philosophical stance as, "justice is to give everyone their due." They furthermore use the work of Lötter to analyze the potential role of social justice in design and interaction design. Another definition of social justice in HCI is provided by Strohmayer et al. [26]. The article centers around a sex-worker organization in Canada and analyzes the usage of a tool to help sex-workers report abusive customers. Strohmayer [26] discuss a gap within justice-oriented literature in HCI, proclaiming that a more nuanced discussion of the implications and meanings of justice is needed. By interlinking the idea of Fraser's multidimensional justice with previous HCI literature, authors develop three implications for developing digital technologies for stigmatized, criminalized, and often misrepresented communities. Moreover Irani et al., [13] discuss postcolonial computing in an HCI context. Notions of social justice are described as power, authority, legitimacy, and participation in the context of globalization. Moving to other works, social justice has been attributed to many various studies in HCI with a major focus on groups who are vulnerable or in some sense, stigmatized, marginalized, or discriminated such as sex workers, women living under heavy patriarchal structures, gentrified communities, and other groups discriminated against [8, 11, 22]. From existing literature on social justice in HCI, a group rarely mentioned emerges as older adults. Older adults may not directly be seen as marginalized or discriminated in a larger sense, instead, other aspects of injustice can unite senior communities, such as class, ethnicity, or gender. However, in this paper and the study conducted, the general unifying aspect of vulnerability is age. Analyzing older adults technology use using a social justice perspective is done by highlighting societal structures such as such as

pressure of technology use in society, isolation from society interlinked with technology, and exclusion from digital services.

2 Age and Older Adults in HCI

To frame the research question, below we present research on older adults and technology use from HCI, Cognitive Science, Psychology and Behavior and Information technology.

2.1 Capabilities, Adoption and Acceptance in Technology Use

The barriers between age and technology use are often described as capabilities, adoption and acceptance [2, 4, 7, 15, 21, 33]. Capabilities, adoption, and acceptance imply that a person may not use technology because of physical or psychological obstacles or because of personal choice and attitudes. There has been attempts at extending concerns of acceptance by not only looking directly at personality and acceptance but also social support and prior experience [2, 15]. For example, [16] extends the TAM (technology acceptance model), a commonly used acceptance model within HCI, with additional phases building out theories to create a bigger understanding of what makes mobile technologies accepted by Older adults [16]. Extension of the TAM includes aspects that, on the one hand, includes prior experience and peer-support, but on the other hand does not include aspects of how life could be of good quality even without mobile technologies. Similarly, [28] extends the discourse on Older adults and technology use in HCI and wants to "go beyond seeing Older adults as merely old or limited" when it comes to system design. They see a huge impact on what groups of Older adults are included in their study and states that many of their findings should not be "over-generalized" due to missing factors. Moreover, they also discuss how the results point to a more complex perspective on social connection from technology use and how this could, for example, be accommodation differences of infrastructures.

2.2 Age as an Economic Opportunity for Technology Development

In business, economics, and HCI, aging is often discussed concerning an economic perspective. As the population of the world is getting older with fewer individuals being able to care for Older adults, how can technology aid with rising costs of eldercare [11, 18, 26]. Mosthagel [27] discuss how studies on older adults' attitudes towards technology often lack a business and economic perspective. Accordingly, one example of how to lower the cost of care for older adults is to design digital technologies that help older adults live at home longer if possible. Such technologies would not only help many older adults, who wish to live more independently at home but may also lower senior care costs The potential of using technology to aid with the dilemma of cost vs. care is, according to [6] very high, and benefits can include social interaction, medical providing, and assistance. On the other hand, even though launching technology to help not only with eldercare costs, easier management for care providers and older adults to maintain at home independence, other ethical risks can arise.

Sharkey et al. [24], discuss practical risks of having in-home technologies in the form of robots to help older adults in their everyday life. The arising risks include privacy risks, information obtaining risks, and possible shortcomings from the in-home technology potentially leading to physical harm. Likewise, [12] discuss how assuming that older adults will use assistive technologies just to maintain their independence or to gain social interaction is highly overstated and that technologies should see to each individual's diversity addressing the functional, emotional, and social needs. Moving from such statements of ethical considerations and overstated potential of at-home technologies for older adults, other challenges arise when technology is only discussed as positive when trying to solving large societal challenges such as care vs. costs without going deeper into how this change might take place and affect the lives of older adults in a particular society.

2.3 Ageism and Stigma in Technology Development

Technology development for older adults is often built on ageist discrimination creating a vicious circle according to Ivan et al., [14]. They describe how technology design and development is often conducted by youth for the youth market therefore alienating older adults rendering them to not want to use such technologies. Similarly, [19] discusses how the digital divide is often researched in relation to older adults and their internal characteristics such as technophobia, physical and cognitive decline, and computer literacy. They discuss how the factor of ageism defined as age discrimination is not sufficiently explored in research about older adults and technology. Designing and building technology for older adults and older adults may not only center around a youth market as in [14] but may also be built on negative stereotypes around aging [18] causing a product development to not meet the correct needs of the target group. Stigmatization amongst older adults is discussed by [29] as stemming from a discourse that has relied on the biomedical aspects of aging in contrast to the psychological and behavioral. They argue that much HCI research further elongates stigma since less focus is put on other aspects than physical and medical. These arguments stem from earlier work of [9] which bases conclusions on funding decisions made in the US. This funding was primarily put into biomedical research on aging instead of humanities, behavioral sciences, and psychology. [29] continues to build on these conclusions and discusses how this focus on the biomedical aspects of aging has tipped over into public spheres and, in the end, mass media, meaning that a social view on aging as pathological or abnormal has grown. This view has according to [9] led to a collective discourse of aging where much HCI research is conducted with a notion that ageing can be solved by better and more expensive technology and medical services. This view that technology can aid with certain age relating problems and issues is much explored within HCI [4, 6, 21, 25, 33]. A large proportion of this research scratch the surface of discussing technology use interlinked with or structures of a society but none of them further develop arguments for why such aspects may be regarded as having major impacts on older adults' technology use and lives. In summary [14, 18, 19] points to bias technology development for older adults, excluding insights on ageism and negative stereotypes on aging as damaging for Older adults and technology development. [9, 29] further points to how much research in HCI is researched with the concern that age can be bettered or solved with technology.

3 Data Collection and Method

In this paper, research on a social justice perspective to highlight societal structures surrounding older adults' technology use is centered. The aim is to highlight the need for incorporating of societal factors in research about older adults and technology use in HCI. To do this, I conducted an interview study with 15 older adults living in Sweden. The call for participation was done through senior citizen organization websites in the north of Sweden. I contacted individuals who worked in the organization and had their emails officially posted on each website. By focusing directly on these organizations participants was certain to be an older adult and "senior" according to themselves. I choose to contact half of the individuals from four different websites and sent out an email containing information about the study and the focus of the interview questions.

Participants were asked if they were available through phone and their preferred time of the interview. Initially, 11 men and 18 women were contacted whereas 3 men and 8 women responded. Through the first interviews, participants recommended additional individuals (4 extra women) who also considered to take part in the study. In the end, 15 older adults were interviewed, 11 from initial contact and 4 from snowball selection. At the time of the interviews the Covid-19 pandemic was still affecting the lives and routines of our participants and we therefore choose to conduct the interview through telephone. I recorded each call with the consent of our participant by putting them on speaker phone and recording with quick time player on a computer standing next to the phone. Each interview lasted from 20–50 min.

I created an interview guide which was divided into two parts. The first part included questions about participants' life situations and the influence of the COVID-19 period. I asked about their daily routines and how they were different from before the pandemic. I also asked them about their home and social life. The second part included questions about the participant's technology use, such as what they have at home, what they use every day and if/how they had used technology more or different since the start of the Covid-19 pandemic.

3.1 Analysis

After conducting the interviews, the audio files were transcribed non-verbatim to word documents. The data-transcripts were analyzed in a team of three researchers using a thematic analysis [3] and we started by initially coding the data, highlighting experts that aligned with the research aim. After coding the transcripts, we sorted the codes into categories formed by similar codes. Lastly, we sought to group once again our categories into three overarching themes. From our thematic analysis we posit three themes, i) the importance of technology to live a connected life, ii) Force and frustration from the technological push in society and iii) Societal exclusion from technological divides.

Table 1. Participants overview

Participant no.	Gender	Age	Living status	Earlier occupation
1	Male	70	Married	Economy manager
2	Female	71	Married	Teacher
3	Female	76	Lives alone	Manager
4	Female	70	Married	Nurse
5	Female	69	Lives alone	Nurse
6	Female	70	Married	Occupational therapist
7	Female	77	Lives alone	Teacher
8	Female	74	Married	Tax-worker
9	Female	73	Lives alone	Teacher
10	Male	70	Lives alone	It-specialist
11	Female	76	Lives alone	Cultural worker
12	Female	80	Married	Technician
13	Male	70	Lives alone	Administrator
14	Female	71	Lives alone	Manager
15	Female	79	Married	Teacher

4 Findings

In this paper we center the research question: *What are the opportunities to incorporate societal factors of technology use affecting the lives of older adults?* Foregrounding a social justice perspective, we proceed to analyze how our participants uptake technology living within the Swedish digital society, how the Covid-pandemic of 2020 and forward changed their usage and how this period made visible those who do not use technology and the negative effects arising from this.

4.1 The Importance of Technology to Live a Connected Life

As the Covid-19 pandemic proceeded, older adults saw many of their daily activities become more restricted. For example, many physical meetings held by various senior citizen organizations started to shut down to protect their members from infection. Similarly, gyms, restaurants, and museums, started to restrict their hours and space. This process of social distance had an effect on many of the older adults in our study. However, at the same time many also started using technological tools to connect with their former physical activities. Participant 2, describes a scenario where she and her husband attempted to use a video call app to attend their niece's graduation ceremony: "Well, we were supposed to connect to my niece's graduation, and it was fun because we had made a little sign and sang for her, so that was amazing".

As many participants had started to use their technology more and in a different way than before, others had already gotten used to technological tools as a way of

socializing. Participant 3 shares how she used to see her grandchild through zoom before the pandemic: *“Before my younger daughter moved here from Stockholm, and her son was about three, I would read stories to him through my phone and we would sometimes play hide and seek. Now we don’t do that anymore when they live here instead we see each other in real-life”*.

Similarly, to participant 3, participant 14 would also use technology to connect with family members who were because of distance or the pandemic out of reach. Participant 14 mentions her mother who lives in an eldercare home: *“I have to say that I have appreciated facetime very much. My almost 100-year-old mom is still around, she turns 100 in February and where she lives they have been wonderfully good in reaching out through face time. Its just great!”*.

Technological tools in participants everyday life were discussed effortlessly as a vital part taken for granted, many had for years used both apps such as messenger and WhatsApp to text with friends and family, and facetime was for example, also used by participant 8 to talk with her grandchildren: *“We use our smartphones daily many times and we have for example messenger and facetime where we mostly talk with our grandchildren who live in. Its fun to see them and we have a good connection even though they live so far away”*.

Likewise, participant 9, describes her use of her smartphone money transfers and social media updates as *“easy to use for everything most of the time, its easiest like that”*. As participants turn to at home technology, extending their social connections online, a parallel discussion on pressure and force arises. Participants reflect on how society plays a role in a strong technological implementation and force below.

4.2 Force and Frustration from Technological Advances

When discussing technology use amongst older adults and relations to technology, feelings of force and frustration emerged amongst several participants. These feelings were by participants linked to the large implementation of technology all throughout Swedish society and how society itself plays a part in this technological force. P11 explains how older adults may not want to use technology simply because they do not want to and critiques society: *“Society forces people in their last stages of life into something they don’t want (technology) and makes them feel totally lost”*.

P14 makes similar statements and discusses acquaintances suffering from negative consequences due to not using technology: *“Basically, there is nothing you can do without using technology at this point, you are completely dependent on it... One can barely go shopping without technology, that’s how it is today. I. have an acquaintance who is single and alone, and she can barely pay bills via computers. Stuff like that is completely alien to her, it’s like a nightmare”*. P7 extends their feelings of anger to age discrimination and technology: *“Sometimes I think about age discrimination that I experience sometimes. I get so angry thinking on how society establishes how it is necessary to have a computer and a cellphone”*.

Further feelings of frustration were connected to public services such as access to money and banking options. P12 described an event in their life where they wanted help from the bank with a bank app for money transfer: *“I tried to get help at the bank with an app for transferring money, but I couldn’t get any because there were some darn*

codes that I was supposed to hand in. It was something with six digits that I could not remember. so that wasn't nice". Participant 8 similarly thought that the money question was an issue: "I think paying with my card is easier but at the same time I think it is terrifying that you can't use cash. I think about not having a computer and how it makes you completely powerless, you can't pay bills or send emails, it is a vulnerable system I tell you".

Participant 3 likewise reflects on digital money transfer services: "I cannot understand how people manage without computers in these days. It's just something that you need to have today".

When encountering new technologies or having to adjust to new features, participant 12 would talk herself into not backing down reflecting over the positive outcomes that learning could bring: "The technology we have at home is really good, I would definitely not manage without them. I am not shy learning new technologies or learning new stuff... I have a saying: technology cannot win over me".

Similarly participant 9 briefly reflected on not having technologies: "it's hard to imagine being without technologies, I take it for granted, if it was not there life would very different., it's just there and I expect it do work, it would probably be a disaster if it wasn't there".

As participants discussed their own reflections of technological force and opportunities, many reflect on their family and friends who for various reasons did not have the same opportunities or will to use technology causing negative consequences.

4.3 Societal Exclusion Through Technological Assertion

Family or friends who did not use digital technology would often feel left out from certain societal areas. For example, participant 2 discuss how her older mother felt dejected because of not having the same opportunities to information or housing as others who had access to the internet: "Just look at my mother she is a lost generation, she feels very disregarded and angry, sometimes a commercial says just enter www. but she can't... .10–15 years ago when she became a widow, we showed her a computer we were going to plug in, but she didn't want it. Now she says, what if I had listened to you?".

When turning a certain age, some people would feel that technology was simply not a part of their life that they wanted to explore. But this preference could according to Participant 7 lead to negative consequences as they discussed an acquaintance who felt too old to use technology but still felt left out despite having the choice: "sometimes I think of my 98-year-old neighbor that doesn't have a computer. She doesn't feel there is any need for her to have a computer at her age, which is perhaps understandable. But I mean you need a computer to put yourself in a queue for a retirement home.... It is the same with the bank and there is no one to talk to. You have to go through the internet and that makes me so upset because I feel like everyone should have the right to a functioning everyday life. No one should be forced to do something that you don't have the possibility to do and there is no help to get".

Many participants generally felt frustrated about the fact that in the Swedish society, digital change is happening at such a fast pace causing some people to get completely left behind. P8, says: "Some people don't have a computer and they are actually quite many; they are left behind and that's sad for them". Discussing how the development of

the digital society has negative implications for many senior individuals, participant 14 extends: *"There needs to be an understanding for Older adults who can't learn technology because of their age or income. There have to be opportunities for all of us despite knowledge levels.... It speaks for itself that a person who has never in their working-life used a computer or a mobile phone and is 85 cannot naturally understand how to pay bills digitally. There has to be opportunities for all of us to make every-day life work"*.

Reflecting on how her own journey with technology is progressing, p11 discusses how it has simultaneously made her think on older adults that does not keep up with the same speed therefore becoming excluded: *"As of right now I have a better relationship with technology, I have started to understand how important it is. But I have also started to understand how difficult and dangerous the digitalization has become. I'm fine, but what about those who are older? They don't even know how to do some stuff; they don't have a computer but all the time they are being told to find services on their computer? I can't help to think about older people that constantly feels like crap. They are really being excluded!"*. As these findings point out there is a concern amongst those who are efficient in technology about the strong force and pressure to use technology in order to be connected to vital societal services and opportunities. We move to discuss our findings and present three opportunities for HCI research to bridge a social justice perspective with research on older adults and technology use.

5 Discussion

By illustrating how society and technology is interlinked through the empirical study opportunities are framed around how a social justice perspective can benefit research about older adults' technology use in HCI. The opportunities framed, gives HCI researchers ways to go beyond research about older adults' technology use that does not incorporate societal factors which can create partial biased perspectives. We cater to the research question: What are the opportunities to incorporate societal factors of technology use affecting the lives of older adults? In answering this question, we advance a series of three opportunities: 1. *Dismantling negative societal negative effects from technological implications* 2. *Understanding how technology excludes older adults from services*, and 3. *Acknowledging ageism in society*. These opportunities aim to support HCI researchers in designing technologies for and with older adults that account for how societal structures can affect older adults' life and technology use.

5.1 Misdirected Focus: Capability, Adoption, and Acceptance

The first gathered stream of research was called "capabilities, adoption and acceptance of technology connected to age". The section showed how research often rely on older adults' personal characteristics, such as how capable they are and if they will adopt or accept technology in their life [2, 4, 7, 15, 21, 33]. Much of this research do not take into consideration factors of society such as pressure of technology use in society, isolation from society interlinked with technology or exclusion from social and private digital services causing negative effects living in society. [16, 28] make attempts to extend models and frameworks about acceptance and capabilities in older adults technology use

technology use. Both argue for extending scholarly work centered around technology use for older adults, moving beyond, for example, "seeing older adults as merely old or limited" or to include aspects of prior computational experience in research. Despite efforts, neither provide deeper material about societal factors and how that may play a large part in conducting such research. As illustrated in our study, societal factors have a large impact into how some participants discussed struggling to access certain opportunities through technology. Despite many of them using technology on a daily basis, socially connecting with friends and family, participants 7, 14, 2, 8 and 11 all mentioned family, friends, and acquaintances directly suffering in their daily life from not wanting nor being able to use digital technologies and as an extension created negative feelings. P2's mother had earlier felt that she was too old to use a computer but now regretted her earlier choices to not become a computer user due to the negative effects of not using one. P11 expressed frustration about how there is a lack of empathy and opportunities for older adults who does not use technology and how such individuals are constantly being told that they need computers. P8 discussed how older adults who does not have a computer is completely powerless and how the system (society) is very vulnerable for those who have chosen not to use technology. These examples from P2, P8 and P11 all highlight individuals that do not use technology because they have at some point chosen not to. This choice has resulted in negative consequences for them and their lives. Wanting and not wanting to use technology is a choice likewise is for example acceptance. But older adults may not have been fully aware of the potential consequence's their choice would render. Therefore, capability, adoption and acceptance factors can be misdirected in that it does not recognize how some older adults does not want to use technology and how these choices should be respected. This poses a challenging dilemma but likewise a social justice perspective opportunity for the HCI discourse:

- *Opportunity 1: Dismantling negative societal effects from technology implications*
HCI have the opportunity to focus beyond capabilities, adoption and acceptance to acknowledge how older adults that does not want to use technology are affected negatively in society. A social justice-opportunity would not seek to aid or solve senior's situation with more technology for them, but rather to form technology to dismantle such negative societal effects they experience. For example, how could HCI be engaged in local or national policies that forces older adults to use certain technologies or platform to obtain information or services? Would it be possible to have personal physically engaging with older adults who wants help them as a part of a service provided by the government or municipality?

5.2 Technological Exclusion from Non-use

In many recent studies, of the rising population of elders vs. lowering the costs of eldercare with technology is discussed [6, 21, 25]. Such statements of the immense potential of technology for eldercare rarely include societal factors and as a result miss out on valuable insights [12, 24]. [21] creates arguments for how research on Senior's technology use lacks a business and economics perspectives. In this stated shortcoming by they do not look into how a societal perspective might frame thoughts of economy. I frame these arguments about technology as tools for lowering costs of eldercare insufficient because it rarely discusses the importance of societal factors and we urge researchers

to frame such dilemmas with a perspective on societal, cultural, emotional, and political instead of only economical. In our study connections were made to certain services that would make older adults lives better. These services were for example, paying bills digitally, being able to transfer money digitally, finding information and housing opportunities. P7's neighbor couldn't enter them self into a queue for a retirement home and was ultimately excluded from a housing opportunity because of this. P2 discussed her mother that could not get information on products or services because all information she wanted to access existed exclusively online. P12 discussed an unpleasant situation in the bank resulting in not being able to use a common money transferring app. Moreover, the discussions from P7, P14, P2, P8, P11 illustrates how not using technology can result in exclusion from many important social and private services meant to make life better. This causes a dilemma but likewise an opportunity for HCI:

– *Opportunity 2: Service provision for technological non-use*

The HCI community have a social justice opportunity to shift our attention from the economic benefits of technology to understand how older adults not using technology may be excluded from social and private services rendering their lives less manageable and with less economic opportunities. Such services can include but are not limited to, housing opportunities, paying bills, and transferring money. Can we offer for example, analogue banking options for those who prefer them, and more person-to-person services for those who would like help? Could it be possible to hold onto analogue services for as long as people need them and when the interest for them lessens only then discontinue those services? Could we imagine a local housing bureau for older adults who do not use the internet that they can go visit in real life?

5.3 Fostering a Deeper Understanding of Ageism

Research about older adults technology use often criticizes related research for not acknowledging ageism or age-discrimination [14, 19]. Both on terms of having bias youth producing technologies for a youth market and making products not wanted or adapted for senior users. Similarly [18] urges researchers to include older adults in every stage of technology design and argues for how ageism might play a role in their adaptation of technology. [14, 18]. All make important arguments for how ageism and discrimination should be an included factor in research about older adults' technology use. Without such acknowledgments much valuable insights about how older adults experience their place in society may never be reached and instead research with partial perspectives will be reproduced, in the end causing negative effects [14, 18]. Such insights on age discrimination and ageism are discussed in our study where many participants expressed frustration against strong technological force in society. Participants 11,14,7,12 all expressed negative feelings and experience when discussing certain situations about technology. P11 meant that the societal force of technology made some older adults feel totally lost, similarly P14 meant that without out technological skills it is barley possible to perform basic tasks, making life feel like a nightmare. P7 linked this force to age discrimination saying that individuals need to have a computer in order to get by in society. Furthermore, stigmatization can be found both in the public and in

HCI discourse according to [9, 29] and they argue how ageing is often framed as problem manageable with technology. Stigma and a partial perspective portrayal of age in technology can prohibit HCI from developing beyond such arguments and continuously reproduce such perspectives that does not recognize how societal structures can affect senior's life and technology use. But opportunities also arise.

– *Opportunity 3: Acknowledging ageism in society*

The thirds social justice opportunity HCI can acknowledge draws on feelings and opinions on ageism of participants or target groups. To include such acknowledgments, this could be done by consulting participants about their life situations and by going deeper into aspects of stigma and marginalization. This acknowledgement would frame HCI research about older adults beyond general age-related vulnerability and include societal factors into how ageism is experienced. By for example, discussing the background of participants, do they have extensive experience of technology from their work, if not do they want more knowledge? How can society, the government, municipality, or community takes these steps to actually incorporate older adults in such education. However, research should always acknowledge that those who do not wish to use technology should still have the same societal opportunities as those who do.

6 Conclusion

This paper aimed to highlight the opportunities to include societal factors of older adults' technology use and to look beyond for example capabilities, acceptance and economic benefits. From a literature background including HCI, cognitive science, psychology and behavioral and information technology research, qualitative interviews with 15 older adults were conducted. Through a social justice perspective where the data was analyzed focusing on how societal structures in technology development and implications affect older adults three opportunities arise: 1. *Dismantling negative societal negative effects from technological implications*, 2. *Understanding how technology excludes older adults from services*, and 3. *Acknowledging ageism in society*. These three opportunities contribute to an ongoing discourse of social justice in HCI.

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Mapping the Digital Injustices of Technology-Facilitated Sex Trafficking

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Mapping the Digital Injustices of Technology-Facilitated Sex Trafficking

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Abstract. As technology and social media develop and expand, technology-facilitated sex trafficking becomes increasingly difficult to take action against and prevent. Technology-facilitated sex trafficking implies the use of digital tools such as social media platforms to coordinate trafficking and (mis)lead persons into sexual exploitation, e.g., commercial sex. To address and prevent sex trafficking as it expands through technology, legal frameworks can both help and interfere with the work provided by aid organizations and authorities. We present an expert interview study with six professionals from authorities, women shelters and NGO organizations working alongside *the Swedish (governance) Model*. Our findings show that digital technology is useful yet heavily challenging for anti-trafficking organizations and authorities in their fight against sex trafficking, exploitation, and digital child abuse. More resources and tools are needed to mitigate the (mis)use of technology and prevent abuse. To do this, we discuss the need to recontextualize efforts against trafficking within the structural conditions and legal model of Swedish society that *facilitate* exploitation. Furthermore, we propose a series of risk-mitigating approaches which centers four questions for the HCI community working towards anti-trafficking efforts.

Keywords: Technology Facilitated Farm · Sex Trafficking · Social Justice

1 Introduction and Background

Technology-facilitated trafficking refers to the social and technical ecosystems wherein individuals use information and communication technologies to engage in human trafficking and related behaviors [1]. One example is that of *sex* trafficking as it migrates to for example, escort websites and mobile applications, streamlined with electronic payment options [2]. While technologies to combat sex trafficking proliferate, [3] and yearly many initiatives are launched around the world to create awareness and fight sexual and labor exploitation [4], technology-facilitated sex trafficking continues to expand [5]. Despite the large positive outcomes of digital platforms and technology-enabled solutions, human trafficking works within the same digital devices and interfaces to, for example, recruit, exploit and track victims. Through for example, child grooming [6], revenge pornography, cyberstalking, sexual coercion [7] or cybersex trafficking [8] predators mislead others into abuse.

The politics of regulation and governance models of sex work throughout the world means that individuals in sex trafficking may be more or less likely to become criminalized and further stigmatized due to fuzzy boundaries between consensual sex work and sexual abuse leading to increased real life vulnerabilities [9]. Governance models and legal frameworks can contribute to an escalation of sex trafficking within a country increasing or decreasing criminalization of individuals caught in a vulnerable situation [1]. Prior work has shown that, as sex trafficking becomes increasingly mediated by technology and nationwide governance models of sex work make individuals vulnerable on different scales, tech-enabled counter efforts are pressing [1, 3, 10, 11]. Moreover, anti-trafficking organizations and authorities play a crucial role as they are often the first contact point between a victim and a way out of trafficking [2].

In this poster we consider how technology-facilitated sex trafficking is entangled with one of the major legal models of sex work. We explore the Swedish Model as one of the largest implemented legal models in the world and present a pilot expert interview study with six professionals from organizations based in Sweden. Participants work to address sex trafficking, sex work and sexual abuse towards women and children. Finally, we consider how technology could be reimaged to reduce structural risk factors to prevent exploitation and trafficking in the context of the exemplified legal framework. We highlight how issues of privacy and security, social media exposure, and the fast-paced evolution of ICTs are entangled in gender-based violence and vulnerability and suggest a series of risk-mitigating tools and approaches for anti-trafficking efforts. We contribute to ongoing research on social justice in HCI.

2 Expert Pilot Study

To collect data on technology-facilitated sex trafficking we contacted and interviewed six women working with human and sex trafficking, gender inequality, gendered violence, and child abuse. Our participants daily work is aligned with the rules and legislation provided by the Swedish Model as one of the largest implemented governance models of sex work in the world. All participants were recruited based on their professional activities working with victims of sex trafficking and those involved in sexual services, and affiliation with various institutions and organizations dedicated to supporting victims of the sex trade and promoting a more equal society (Table 1). A total of six self-identified women participated in our study with an age range of 26–62 years old. Together, they were representative of a large variance of backgrounds, experiences, and knowledge regarding the complexity of sex trafficking and how the trade explores technology enabled tools and systems. Their individual experiences in the field range from five years to over 20 years. This involves them working across different regions in Sweden and operating within the Swedish Model. Questions of sex trafficking and abuse were issues central to participants who in their roles constantly deal with topics of sex work, sexual transactions and/or sexual abuse and address these according to the operating model. As all of our participants work within the Swedish Model, they all have experience with what mechanisms of the law can have positive or negative outcomes for individuals that are or have been involved in any type of sexual transaction business. The Swedish Model provides professionals with how to take action through for example, criminalizing

any person organizing or engaging in the purchase of sexual services and understanding any person selling sexual services as a victim. The model also centers around the notion of demand and gendered violence as being main challenges when dealing with technology-facilitated sex Trafficking.

Table 1. Overview of pilot study participants

Participant	Organization	Title	Role
Ingrid	Organization for Women in Sex Work	Board Member	Coordinator of Organization
Roberta	A Swedish municipality	Coordinator Against Human Trafficking	Lead Researcher of Field Operations
Sara	Women Shelter Group	Volunteer	Support Provider for Women in Sex Work
Anastasia	NGO for fair sex initiatives	Director and founder	Daily Management and Head of Operations
Petra	The police Authority	Superintendent	Lead coordinator of sex Trafficking Data Collection
Bea	Family Center for Children	Psychologist	Head Evaluator of Child Abuse

3 Three Approaches for HCI Anti-Trafficking Efforts

From our expert pilot study, we summarize three approaches centering efforts for researchers and companies designing and developing tools which can potentially be misused, for anti-trafficking organizations and authorities seeking to broaden their scope of aid and society in general as laws and legislation interlink with these various stakeholders and victims.

Legislation of Social Media Abuse. As social media is a major tool for misuse, legislation is one crucial if not the largest tool to mitigate abuse. In Europe, the General Data Protection Regulation (GDPR) demands compliance and made companies worldwide review ways of handling, storing, and sharing user data, which in turn creates better insights for users into how their content is handled. Similar to GDPR, what could make a substantial difference in risk mitigation on social media is the question of anonymity, i.e. should a person on social media have the possibility to be completely anonymous and thereby not responsible? If a person has an identity tied to an account this would firstly prevent underage children to sign up, then secondly if a user is found to groom, persuade, or hurt another user, or a trafficker pretending to be a consensual sex worker, they can easily be located, and fake profiles would be heavily limited. To acknowledge how legislation needs to interlink with HCI interventions we consider: 1) *How can HCI*

interventions address technology-facilitated abuse interlinked with current legislation processes and push necessary policy change?

Designing for Fuzzy Boundaries. It is critical to recognize the challenge of the widespread accessibility of websites for sexual services. Predators can nowadays reach a much wider range of people, specifically children. Sexual services can for many young individuals be confusing and misleading. Simple conversations or digital interactions may, at first, seem innocent but can after a while lead to misinformed decisions and pushing boundaries, as for example, in the case of sugar dating. Such initially innocent but predatory interactions are acknowledged by the Inter-Agency Coordination Group Against Trafficking in Persons [3] which state that recruiters in human trafficking may use fake social media accounts and fake profiles to gain the trust of potential victims. This very broad (mis)use of technology and reaching many vulnerable individuals need to be acknowledged in HCI and the design of future tech-enabled interventions should consider the following: 2) *How can we design digital platforms that cannot be (mis)used in i.e., sugar dating as an abstract practice of abuse and sex trafficking?* 3) *How can we design technology interventions that mitigate and stop already ongoing (mis)use and abuse?*

Malicious Scenarios for Anti-trafficking Awareness. A major problem in mitigating risks in digital technology and on social media platforms is that misuse develops rapidly making it hard for any organization, authority, or legislation to keep up [3, 10, 11]. The misuse is nuanced and creative in ways hard to predict and to change because of, for example, tech companies not sufficiently cooperating with authorities, servers of malicious websites located in different countries, language barriers of overseas victims and closed of black markets such as the dark web where untraceable cryptocurrency is used in transactions. The high-speed development of technological misuse could be addressed in the early stages of technological development. Creators, developers, and designers would run malicious scenarios of their artefact and attempt to predict misuse. These predictions would then provide aid organizations and authorities with data on how and where help efforts would need to be directed. Furthermore, this type of abuse analysis could be conducted on already large digital platforms where sex trafficking is present. Nonetheless, such scenarios would probably cause tech and social media companies to have to change or cut different features and would potentially lead to a loss of revenue, which lead to our fourth question: 4) *How can HCI work towards demanding tech-companies to regulate products causing misuse (such as sex trafficking) in order to protect users even if regulations mean loss of revenue?*

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Technological Pathways Towards Justice and Change

Exploring digital support and socio-political structures of gendered violence with victim-survivors of sexual abuse

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Technological Pathways Towards Justice and Change

Exploring digital support and socio-political structures of gendered violence with victim-survivors of sexual abuse

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Abstract

Sexual violence is a particularly challenging issue due to its many complex social nuances. Women with experience of sexual abuse often report on several serious effects and difficulties in obtaining any real sense of justice. While HCI research has in recent years adapted a more nuanced perspective on how digital technology can support both recovery and justice for those affected, we argue that HCI also has the potential, and responsibility to strive for socio-political change to fundamentally address gendered violence. To explore such support and change, we elicit a social justice perspective and the four domains of power framework to contextualize how HCI initiatives can be shaped to inform socio-political change. Through a two-part data collection study, consisting of surveys and interviews with women bearing experience of sexual violence we identify four themes to inform HCI research. The following discussion suggest a number of ways in which digital technology can support independent paths to justice for women with sexual violence experience. We moreover contextualize our insights through the four domains of power framework and suggest a number of HCI initiatives to address socio-political towards gendered violence. Through our study we contribute to the growing area of social justice HCI.

Introduction

Globally, gender-based violence (GBV), is a large systemic issue causing harm and hurt to a large part of the world's population. According to the UN, one out of three women worldwide have or will experience some form of violence and statistics from the European Union shows how 1 out of 8 have experienced sexual violence (European Commission, n.d.; United Nations, 2024). In reality, this number is much higher as the majority of these abuses are never reported (National Sexual Violence Resource Center, n.d.).

Various research fields have centred sexual violence against women as a particularly complex topic due to the large weave of socio-political structures affecting victim-survivors and their experiences (Belknap, 2010; Schnittker, 2022). These structures include how victim-survivors often feel unheard and trivialized in their stories (Henry et al., 2015; Schnittker, 2022), are occasionally accused of false rape allegations (Belknap, 2010), fear re-victimization (Saha et

al., 2024) and find it hard to know if reporting the offense will lead to a sentence (Belknap, 2010; Johnson, 2017). These structures foreground a difficult and challenging path to legal justice for victim-survivors.

Within the field of Human-computer interaction (HCI), researchers have begun addressing ways how socio-technical systems and digital technology can center both complex structures and justice support for victim survivors (Andalibi et al., 2018; Rabaan & Dombrowski, 2023; Strohmayer et al., 2019; Sultana et al., 2022). For example, Rabaan & Dombrowski (2023) suggest the notion of survivor-centered transformative justice to provide technology supported opportunities for Muslim women in the U.S with experience of domestic violence (DV). The authors suggest that pushing women to seek legal justice can increase islamophobia, and racial discrimination. Instead, digital technology can assist in supporting other paths to justice. Moreover, Sultana et al (2022) focus on conservative structures affecting victim-survivors of child sexual abuse and how a lack of awareness, social gender norms and cultural misunderstandings create serious consequences for any victim. By exploring and addressing the perspectives of victim-survivor's, authors build on transformative justice to organize technological social support, digital education for abusers and how to address larger social challenges. In doing so they look beyond legal ways to justice and instead focusing on the root cause of child sexual abuse while supporting those affected by it. Taken together these two articles (Rabaan & Dombrowski, 2023; Sultana et al., 2022) show how digital technology can support alternative paths towards justice for victims of sexual violence while also recognizing the importance of socio-political change.

In this paper, we aim to explore how digital technology can support independent paths to justice for women with experience of sexual violence while also discussing needed socio-political change to address gendered violence. To explore our aim, we work directly with women who have experience of sexual violence and extend discussions on both justice and socio-political structures feeding into gender-based violence. We moreover discuss and highlight how HCI is a fitting area for these challenges. We elicit a social justice perspective to look beyond personal change and instead work to support victim-survivors in their own path to justice while also discussing needed socio-political change to address gendered violence. In doing so we elicit the four domains of power developed by Patricia Hill Collins (2000) to contextualize how our results can support both independent paths to justice and socio-political change within four different social domains. This study contributes to the growing field of social justice in HCI by supporting digital opportunities to independent justice while also underlining the importance of socio-political change.

Background and related work

In this section we begin by discussing how sexual violence stands for a particularly challenging issue in line with HCI, gender studies and feminist literature. We then introduce social justice

and the four domains of power to show how we use the perspective and framework to later shape our results. Lastly, we introduce our study context.

Sexual Violence as a Particularly Challenging Issue

Gendered and sexual violence are topics gaining an increasing interest in social computing research, whereas HCI is one of many academic fields addressing the complex issue of gendered violence (Andalibi, 2016; Miller et al., 2011; Quadara, 2008; Sultana et al., 2018; Ullman et al., 2007). In line with feminist arguments, sexual violence as part of gendered violence sets itself apart from non-sexual violence (such as explicitly physical or emotional) due to its complex nature in regards to both its acceptance in society and cultural meanings (Johnson, 2017; Miller et al., 2011; Schnittker, 2022). Some researchers have even argued that sexual violence such as rape causes more harm to victim-survivors than non-sexual violence because it “undermines the victims embodied selfhood” (Schnittker, 2022). According to Schnittker, (2022) and Wilcox et al., (2006) rape and sexual violence differs from non-sexual violence in that many women generally have a greater fear and anxiety of rape causing an immense effect on their day-to-day life. Feminist arguments of sexual violence also center the different cultural meanings of rape and sexual violence (McPhail, 2016).

The difference between sexual and non-sexual violence is furthermore important to acknowledge as sexual violence towards women have in many societies (and is unfortunately still today in some) not been considered as acts of power and abuse but instead been seen as an inherent part of marriage and relationships (Mahoney & Williams, 1998; Scutt, 1976). This makes sexual violence against women *conceptually* a partially novel form of violence according to McPhail, (2016) because of its historical position as a “natural” part of marriage.

Adding to the complexity of sexual violence is prominent stigma and social judgement which are believed to be large factors into why sexual violence is often underreported. Underreporting means that many victim-survivors choose not to take legal measures after experiencing sexual violence (Kelly & Stermac, 2008; Scurich, 2020). Factors behind underreporting sexual violence points to a fear of extended violence, possible escalation, or accusations of lies (Andalibi et al., 2018; Deitz et al., 2015; Miller et al., 2011). Not only does feelings of stigma and guilt prevent women from reporting sexual violence but the reporting itself can often seem complex and daunting as many fears negative reactions and mistreatment from authorities (Park & Lee, 2021). Moreover, it can be hard for victim-survivors to understand specifically what they have been through and figure out how to deal with the consequences (Maeng & Lee, 2022; Staller & Nelson-Gardell, 2005).

To address the many complexities of sexual violence as part of gender-based violence, HCI researchers have worked to center a plethora of perspectives to provide support to victim-survivors while examining socio-political structures of violence (Foriest et al., 2024; Gini et al., 2024; Spierling et al., 2024). By for example, exploring social media support (Andalibi,

2016), the power of anonymity (Duerksen, 2019) and large web forums for support seeking (Andalibi et al., 2018) perspectives of victims-survivors path to recovery are addressed.

There has also been attention brought to the many social complexities surrounding sexual violence and gender-based violence. For example Sultana et al., (2022) discuss how sexual violence against children in Bangladesh stands for a particularly complex challenge due to the very imminent threat of stigma which might lead to even greater violence. Similarly Strohmayer et al., (2019) report on a sex worker organization in Canada discussing sex work as a particularly stigmatizing line of work where experiences of sexual violence are rarely brought to authorities due to the fear of mal-treatment and trivialization. Thirdly, when addressing technology facilitated sex trafficking, any socio-technical intervention despite being designed with good intention can be misused by abusers to for example track, recruit and abuse individuals in vulnerable situations (Öhlund & Almeida, 2023). To stifle this malicious use of technology is complex and demand large nationwide regulatory interventions in parallel with socio-technical efforts.

Taking measures, driven by a strive towards social change and justice is urgent and socio-technical interventions must consider the multi-nuanced complexities of sexual violence as a particularly challenging type of violence. As sexual violence interlinked with larger socio-political structures of gendered violence, we move to discuss social justice and the four domains of power as two frameworks guiding us towards ways to foreground digital support.

Social Justice and the Four Domains of Power

In this paper we use social justice as a perspective to guide us in our analysis of how interpersonal experiences from sexual violence are contextualized in a larger systemic structure of sexist and gendered violence. We work in line with Bellini et al., (2022), Öhlund, (2023) and Chordia et al., (2024) where social justice is indeed a large concept obtaining to many levels of justice, but should to some level be defined in order to create buildable contributions. Specifically for this paper and its context, this means looking beyond interpersonal ways of change for victim survivors and instead position their experiences to inform how HCI can 1) support them in their own path to justice and 2) discuss needed socio-political change to address gendered violence.

To explore our aim we elicit the four domains of power articulated by author and activist Patricia Hill Collins (Collins, 2000). Originally the four domain of power was a way for Collins to highlight how various social levels organizes oppression towards black women in America. In her book *Black Feminist Thought*, Collin shows how black U.S women are subject to both racism and sexism and reject the notion that white women can define all female experiences, and black men define all black experiences. Through the four domains, structural, disciplinary, hegemonic and interpersonal, Collins show how various interlocking systems in society together oppresses black women in the U.S. Social justice in HCI and Black female

epistemologies by Collins have been proven as a useful tool to analyze intersecting oppression on both theoretical and practical levels (See table 1). This can be seen in for example Rankin et al., (2024) where authors turn to intersectionality to discuss the significance of race and gender, and in Öhlund & Strohmayer (2025) to discuss the overt attention to interpersonal safety technologies to prevent public sexual abuse.

The four domains of power consist of the 1) structural domain which organizes oppression on a larger more abstract scale including laws, policies and governments. In our specific context regarding women with experience of sexual violence the structural domain could include for example, too little initiatives to support victim-survivors, poor funding for women-shelters and short-term initiatives to fight sexual violence - all on national level. The second disciplinary domain would in our context include initiatives to assist women in reporting sexual violence and an overt attention to pushing women to report despite present fear (Schnittker, 2022) and stigma (Deitz et al., 2015). Moreover, the disciplinary domain would include authorities who does not meet victim-survivors of sexual violence with respect and gatekeep processes of justice. Thirdly the hegemonic domain involves ideological and cultural norms. This domain differs depending on national contexts. In various countries, sexual and gendered violence can be tied up to for example religion or moral, and conservative notions on female sexuality (Öhlund & Almeida, 2023; Rabaan, 2021; Sultana et al., 2022). For this domain it is particularly important to analyse the national or cultural context. Lastly, the interpersonal domain regards oppression that happens from person to person and deals with everyday interactions. In our context, this domain would include direct physical gendered violence and for example verbal stigma towards a victim-survivor. While this domain might seem the easiest to address, it would often involve suggesting victim-survivors to change their behavior according to Öhlund & Strohmayer (2025).

In this paper, we elicit the four domains of power to show how and on what level digital support for independent paths towards sexual violence justice can look and to position adjacently needed socio-political change. To provide a better context for how our results can be adopted together with social justice and the four domains of power, below, we give a short introduction to our specific national context.

Table 1: The four domains of power

STRUCTURAL	DISCIPLINARY
Organizes oppression through large-scale social institutions (macro-level)	Manages oppression through practices and bureaucratic rules
HEGEMONIC	INTERPERSONAL
Involves ideological and cultural norms. Shapes beliefs, norms and ideas	Everyday interactions and experiences of oppression through personal relationships (micro-level)

Study Context - Sexual Violence in Sweden

Sweden, a country located in the North of Europe, part of the Scandinavian Countries is often discussed in contexts of nations with high levels of gender equality (Goldscheider et al., 2013; Gottzén & Berggren, 2020; Levy & Jakobsson, 2014). In 2017, it was even stated by the ruling politicians that Sweden now has the world's first outspokenly feminist government stating that *"A feminist government ensures that the equality perspective is included in the design of politics on a broad front, both in national and international work"* (Sveriges Riksdag, 2017)

Commonly discussed factors of this gender equality are for example, the long period of paid parental leave offered to both parents with an emphasis of sharing the time away from the labor market equally (Svensson). Moreover, in 1979 Sweden introduced the "Gender Equality Act" a law which meant that women and men should have the same conditions in their social life with equal rights to work, employment and development (Swedish Gender Equality Agency, 2024) (Swedish Gender Equality Agency, 2024). Other factors of gender equality in Sweden regards the gender specific crime called "gross violation of a women's integrity" which was enacted in 1999 to fight men's violence against women. This crime builds on the so called "normalization process" which accounts for the lengthy process of manipulation and abuse occurring in intimate partner violence (Belknap, 2010)

These factors and many more taken together has created a general view of Sweden as one of the most gender equal countries in the world (Martinsson et al., 2016; Swedish Gender Equality Agency, 2024). However, despite this often-self-proclaimed status of gender equality and opportunities for women, statistics of gendered violence and in particular sexual violence are the highest in Europe (Gottzén & Berggren, 2020; Gracia et al., 2019). These opposites create a paradox sometimes called the Nordic paradox which represents these puzzling oppositions (Gracia et al., 2019; Wemrell et al., 2019).

Some government research suggest that these high statistics of sexual violence in Sweden is because of measurement-bias pointing to false statistics (Swedish Gender Equality Agency, 2024). According to the Swedish National Council for Crime Prevention the high statistics of sexual violence in Sweden can be because of the high level of gender equality meaning that

women who recognizes their rights are now more prone to report. (Swedish National Council for Crime Prevention, 2020). The same government organization means that *“If the legal conditions and statistical methods had been the same as in Germany, Sweden would rank somewhere in the middle of the report statistics from Eurostat”*. However, while this governmental source claims that Sweden does not in reality stand out from statistics on rape, other sources point to the opposite such as Gracia et al., (2019) and Wemrell et al., (2019).

In addition to ruling out measurement-bias, Wernell et al discuss how sexual violence is often in Swedish discourse discussed as being the result of “Others”. “Others” in this case means according to Gottzén & Berggren, (2020) black and brown men in particular Muslim immigrants. In Sweden, by blaming “others” about high level of sexual violence mean they can keep a seemingly high level of gender equality discourse going, since the problem of gendered violence is then not inherently Swedish.

All the different arguments on sexual violence in Sweden such as blaming it on others according to Wemrell et al., (2019), a smaller problem because of measurement bias (Swedish National Council for Crime Prevention, 2020), or that the definition of rape in Sweden is broader than other countries (Gottzén & Berggren, 2020) create a complex discourse for victim-survivors to adhere to. While the reasons behind the Nordic paradox are many and explanations equally so, the fact still stands that sexual violence in Sweden exists on a high level and effect many women in their paths to justice. We come back to discuss the study context in the end of this paper.

We now move to introduce our methodological approach and two-part data collection we elicited to explore how digital technology can support independent paths to justice for victim-survivors of sexual violence.

Method and Findings

In this paper we center women’s experience of sexual abuse through a social justice perspective. The aim is to explore how digital technology can support independent paths to justice for victim-survivors of sexual violence needed socio-political change to address gendered violence.

To explore our aim, we conducted a two-part qualitative study consisting of an online survey in combination with interviews. This in order to gain a broader understanding of sexual abuse towards women, perspectives on justice and the role of technology in such instances. The selected approach was chosen because research on sensitive topics, such as sexual violence is often challenging from a methodological point of view and much consideration has to be taken (Bellini, Strohmayer, et al., 2019; Moradi, 2012; Sultana et al., 2018, 2022). For example, the initial online survey gave us a chance to probe for participants through open calls without having to approach someone personally as sharing sexual abuse experiences is often sensitive. Secondly, the survey gave participants a chance to get anonymously acquainted with the aim

and goal of the study before getting into contact with the researcher. This is argued by Clinch et al., (2019) as an important part of conducting research on sensitive topics. In the second step, when relations between participants and researchers had been established, invitations to interviews were distributed to complement survey data with more in-depth data. All data collection was guided by proper information approved by the national ethical review board to ensure that the participants, all living in Sweden, knew the scope, object of study and how their sensitive data would be handled in the process. Below, we start by presenting part one of our data collection: the survey study and findings. Based upon the findings from the survey study we shaped our interview questions and designed the second part of our data collection.

Part 1: Survey study

A pilot survey was first sent out to a few initial participants to make sure the survey was perceived as comprehensible. Minor adjustments were made including adding questions and clarifications. The next step consisted of sharing the survey with a wider audience. This was done through a number of emailing lists, professional and academic forums, private social media, through various Facebook groups and posters at the local university. On social media the call was shareable to ensure a large spread of the survey. All calls for participation were accompanied by relevant information about the study and a link to the online survey. The posters included a QR-code taking prospective participants directly to the survey. Any person who identified as a woman and had some experience of sexual violence (in their own definition) was invited to the study. Any person who chose to partake in the survey could do so anonymously, but to enable participation in the second step of the study an invitation was included that required sharing of an email address. Out of 23 survey answers, 12 individuals chose to take part in interviews and were contacted by email a couple of weeks later.

The online survey was created in English, so non-native speakers could comprehend the questions. For participants' convenience they could however choose whether they wanted to answer questions in English or Swedish. The survey consisted of four different sections of which the first included questions on age, self-chosen ethnicity, education and current or last occupation. The second section centered around questions on the experienced sexual abuse, when it occurred, how old they were at the time and the consequences of the abuse. The third section focused on justice, how it was defined and potentially obtained. The fourth and final section sought to understand how technology was seen in the context of sexual violence. Most questions were opened ended (except demographic questions) enabling participants to reflect and share as much or little as they preferred.

In general, it took participants between 5-30 minutes to complete the survey. For integrity reasons only one of the authors had full access to the questionnaire and contact data for the interviews. Before any analysis took place the first author anonymized all documents and shared these with the second author. After the first data collection we conducted an open thematic analysis (Braun & Clarke, 2006) initiated by independently reading through,

familiarizing ourselves with and systematically coding the data by underlining meaningful words and sentences. From this initial step we individually produced a total of 186 different codes. Secondly, we jointly refined, color-coded, and grouped the codes into categories, leaving us with 17 distinct categories. From this step, we merged the 17 categories into three potential themes, all consisting of a lower or higher number of distinct categories. Lastly, we refined the themes and named them, i) perspectives on justice, ii) Feeling of fear guilt and stigma, and lastly iii) the complexity of understanding sexual abuse.

Survey findings

The analysis was based on 23 survey answers from women with experience of sexual abuse. We start by presenting our participants' thoughts on i) perspective on justice, discussing how justice can be multifaceted and not exclusively interlinked with legal justice. Secondly, we present ii) feelings of fear, guilt and stigma which discusses the hard and complex feelings following an instance of abuse. Lastly, the third theme, iii) the complexity of understanding sexual abuse highlights the challenges of understanding abuse and reporting or recovering from abuse.

Theme i) - Perspectives on justice

When asking to define justice 11 participants answered that justice is associated with legal consequences. Participant 11 stated, *“Justice is when people who have sexually assaulted someone is prosecuted in a court of law”* while participant 12 meant that healing emotional damage was most important however *“also that abusers get legal punishments”*

Participant 6 also considered justice as being legal measures but extended their opinion by explaining how police work is insufficient when it comes to sexual abuse *“I believe we have to have legal system where clear evidence is needed to convict a person. However, I think that the police drops cases of sexual abuse way to easily.”* Similarly, participant 1, meant that her abuser could *“at least have apologized and at most be prosecuted by the justice system”*.

Outside legal frameworks, many considered additional perspectives on what justice could look like and how it could be obtained in cases of sexual abuse. One of the most prominent perspectives on justice was acknowledgement which participant 7 described as an abuser *“taking the blame (for the abuse).”* Participant 9 moreover meant that justice was when *“an abuser is given the harshest punishment to serve as a form of vindication for the victim”* and participant 17 meant that *“Justice is when it is clearly stated that someone has done wrong by another”*

According to many, justice can hence be obtained when a perpetrator acknowledges their wrongdoing and stand up for their harmful actions. The harm does not necessarily have to be acknowledged in a court of law, but the hurt and damage caused should be openly spoken about. Acknowledgement as justice was primarily mentioned by women who had not been

believed when reporting or talking about an abuse. Participant 5 discussed how acknowledgement of an abuse was more important than convictions in a court of law: *“A feeling of rectification and being confirmed in your feelings of harm is justice to me. To be heard and believed is much more important than anyone being convicted”*. Participant 8 similarly expressed how recognition for *“the victim from the perpetrator”* was important while Participant 10 also considered justice as something that should include those who watched her abuse without interfering *“I would like justice to affect those people (witnesses) more than the person who acted against me”*.

In the complex process of sharing an abuse experience with others, many emphasize the importance of community and support. To have family and friends unconditionally believe and support you is for many highly important and a dimension of justice. Participant 3 mentioned how important it was for her to be able to express feelings of anger and fear to her closest friends. This was for her a way to process what had happened. Participant 8 emphasized the importance of support from friends and family as it could be overwhelming for others to hear about an abuse. She said,

“I felt that people in my surroundings didn't really want to discuss the things I've been through, and they were uncomfortable listening to me...I didn't want to seem like I wanted attention or pity...I just wanted reassurance and recognition so that I could stop blaming myself”.

As described by our respondents, other perspective of justice, than legal, exist and are deemed important. Such perspectives include acknowledgement of harm and community support that should be available to anyone with experience of sexual abuse. Other negative feelings arising from abuse are, fear of stigma and outer and inner judgement. These feelings often plague women after such incidents, bringing us to the next theme.

Theme ii) – Feelings of Fear, Guilt and Stigma

As situations of abuse are commonly stigmatizing, many participants expressed fear or guilt when trying to define, both for themselves and for others, what had happened to them. Some also feared additional violence from their abusers if sharing their experience with others. Participant 2 explained why she chose not to press charges against her abuser *“I did not report or tell anyone because he threatened to make my life a living hell if I spoke about it”*. Participant 13 similarly chose not to come forward as she was *“too afraid at the time”*, and participant 4 said she feared increased harm if reporting her abuser for unwanted touching. *“The first time I didn't even tell my friends, the second time I just choose to leave, instead of confronting anyone...I would worry about the man being capable of seeking revenge on a more brutal level, for example by raping me, so I didn't seek justice”*.

The fear of stigma and judgement from others was prominent amongst many of our participants. The stigma rising from sexual abuse can be very broad and harmful despite the abuser being convicted in a court of law. Participant 5 described this complex and harmful situation: *“He was convicted in court, but I was convicted in the eyes of our community, like*

I ruined my assaulter's life. We had to move from our village as a result". Participant 8, chose to turn to support groups, instead of her own friends, as she felt judged by them when trying to explain what she had been through.

"I felt the need to be validated in my experiences of rape and assault and that people in my surroundings did not really want to discuss the things I've been through as it was making them uncomfortable.

These judgements from others and the stigma surrounding abuse are inextricably interlinked with socio-political structures of gender inequality where many women struggle to be believed and heard. As social judgement harm women in their process of healing and obtaining justice many do not see the possibility of moving forward or to seek prosecution for their abuser. This leads to complex feelings of guilt:

"Today, what hurts the most is that he got away with what he did without any consequences, that no one knows. It feels like I made it okay when I didn't do anything. For me justice would have been if I had stood up for myself, said something and that he would have had to defend himself".

Participant 23 emphasizes her feelings of guilt and shame in a situation of sexual harassment online *"I felt it was my own fault to sex-chat anyway, I was not sure who to blame, me or the other people"*. And participant 15 said she was *"too embarrassed"* to seek support. These feelings arising from situations of sexual abuse described by our participants as feelings of guilt, stigma, resignation, and judgment are strong and harmful feelings that may cause additional hurt in the process of recovery. As many of these feelings interlink with socio-political structures such as being heavily stigmatized and judged by their surroundings, our third theme *"the complexity of understanding sexual abuse"* centers this complexity

Theme iii) – the Complexity of Understanding Sexual Abuse

The complex levels of sexual abuse against women are in several ways interlinked with socio-political structures of gender-based violence. Half of our survey participants discussed how difficult it can be to understand when a sexual abuse has occurred. Many did not understand, until some time had passed, that their experience was actually an illegal act such as participant 18 who did not *"realize a situation of public assault was assault"* and participant 16 who did not report her abuse because she *"did not understand it was a crime"*. This is also echoed by participant 20 meaning that she didn't report the crime because *"at the time I didn't understand I could even report it"*. In a similar vein, Participant 4 describes such a situation: *"I read an article about someone who had been through a similar situation, and it was only then I understood I had probably been drugged and raped.* The feelings of hurt and harm stemming from sexual abuse are not always clearly understood and as presented by our participants it can be challenging to define what has actually happened. Not realizing that the harm done is inherently wrong makes up for complex situations where women and girls carry hurtful experiences, often for a long period of time. Participant 3 explains how she did not see what she experienced as an actual crime, partly due to how common it is for women to be touched inappropriately in public. She said: *"I didn't see it as a crime, I just thought it was*

disrespectful, something beyond my control and something that so many of my girlfriends have experienced...". Understanding that inappropriate behavior actually is an instance of sexual abuse was for some participants perceived as challenging, and the decision to act on it far from straightforward. For participant 21 the complexity came because her abuser was a friend which meant that she *"didn't really understand it was an abuse"* and for participant 22 her being *"too young"* was the reason she couldn't seek support. One reason for accepting and moving on is the consequences of reporting, both when it comes to the draining process of getting legal justice, but also when it comes to how often inappropriate behavior occurs. Participant 6 illustrates the frequent occurrence of sexual abuse as well as the cost of trying to do something about it, when she says: *"I reported 7 assaults, after that I haven't had the energy to report more because it's not worth to go through the process"*.

As outlined by participants, the heavy and harmful consequences of sexual abuse are highly draining, and the idea of reporting events is oftentimes perceived as overwhelming and not worth the effort. Moreover, they also stress how the process of understanding an instance of abuse is challenging, making it hard to decide how to move forward after an incident. The goal of the online survey was to a) begin to explore how women with experience of sexual abuse perceive justice, and b) carefully establish a relation between researcher and participant to enable the second step of the study. To go further into our inquiry, we created a new set of questions based on the survey findings. This new set of interview questions are discussed below in Part 2: Interview Study.

Part 2 – Interview study

From the themes emerging through our first analysis of the survey, we created a new structure of questions for the subsequent interviews. The structure of the interview guide consisted of three different parts, one for each theme identified in the analysis of questionnaire data. In the interviews we shared several key findings from our first analysis and asked participants about their perspectives on justice in instances of sexual violence, the complex feelings of fear and guilt and structural injustices interlinked with sexual abuse towards women.

12 participants from our initial 23 chose to move forward and take part in interviews. Outside of the survey others such as colleagues and acquaintances had shown interest in taking part in our interview study and were contacted. Finally, a total of 16 women participated in our interviews that were arranged either at the office of the first author or through Zoom (if requested by participants). All interviews were conducted by the first author and, as with the surveys, interview participants choose preferred language of the interviews. Each interview lasted between 30-75 minutes with most of them lasting around 40 minutes. Interviews were in a next step transcribed non-verbatim to the same language as the interviews were held in.

Similarly, as we did with the survey data, we conducted an open and thematic analysis of data gathered through interviews (Braun & Clarke, 2006). Firstly, we independently read through,

familiarized ourselves with and coded the data by underlining meaningful words and sentences. Through this process we produced 482 codes divided between the two researchers. Secondly, we jointly color-coded and refined the codes into 38 initial categories. Thirdly, we together revised categories, by merging similar ones, and narrowed them down to 25 developed categories. Lastly, we continued the analysis by sorting categories into 4 themes, consisting of 20 categories and 10 sub-categories.

Interview Findings

From our thematical analysis four themes emerged which together make up for a plethora of perspectives regarding sexual violence. Below we present the following themes: 1) Sexual Violence Aftermath, 2) Sexual Violence Justice, 3) Sexual Violence Support and 4) Sexual Violence Prevention

Sexual Violence Aftermath – The complex path to justice begins

When experiencing sexual assault, the effects and consequences for each woman is in most aspects vastly different. There are, however, some re-occurring patterns of feelings among our participants of which the first was the consideration of how social stigma would potentially lead to a continuation of the abuse. For example, participant 11 discussed how reporting sexual abuse could have a negative, often unpredicted impact, on a person's life:

“If you report or express that you are the victim of an abuse there is a big risk that no one will believe you, that you get questions about your behavior and that your friends start to look at you differently... It can be easier to just carry an abuse yourself than to be the one reporting a friend as an abuser”.

This thought of negative reactions from your surrounding was also considered by participant 10, especially if an abuser was someone you knew, a person others appreciate and respect: *“As a female victim it's easy to think about how your surroundings will think about you if you talk about or report someone that people really like.”*

In discussions on sexual abuse and the effects of it, the feelings and fear of stigma were a reoccurring topic. For example, participant 2 mentions how *“the stigmatization around sex and abuse is in itself a challenge in society... the stigma is a large part of the injustice in sexual abuse”*. Participant 10, similarly discuss how stigma is one of the first *“fearful feelings”* that comes over you after sexual abuse. Not only does it seem to exist a fear of being judged as a *“bad and irresponsible person”* (p13), these feelings of fear are also typically internalized into self-blame and guilt. Participant 14 reflected, *“the fear of being judged can easily come from the fact that you have internalized the social stigma of sexual abuse”*. Many participants mention being plagued by feelings of uncertainty and resignation. The feeling of resignation is according to our participants based on how the justice process feels unfair and very energy demanding, with small chances of a desirable outcome. Participant 7 expressed such feelings of resignation by saying: *“Women may feel that there is no point in reporting abuse since nothing will come out of it”*. Participant 11 shared similar feelings of hopelessness *“It is also*

very likely that in the end there is no closure, that everything was for nothing because there was no evidence”.

Participants further discussed how feeling overwhelmed and experiencing resignation interlinks with how the responsibility for clearing up and investigating abuse commonly falls on women. In their view, the burden of finding evidence, witnesses, stand strong throughout physical procedures and provide clear and concrete reports on traumatic and often confusing events is to an unfair extent put on survivors. Participant 1 explained *“The proof situation around sexual abuse is hard, and many women feel sad and worried about it”*. Participant 6 expands this view by saying: *“Women shouldn’t have to speak up, others should do it for them, and you should be made comfortable enough to do it”*. Participants describe the time following an abuse as an extremely challenging phase. Independently if a decision is made to report the abuse, or not, participants describe a complex process of trying to navigate post-abuse feelings. A process during which many blame themselves and wrestle with feelings of fear, guilt, and stigma. Many participants identify a correlation between these feelings and harmful socio-political structures. Sexist norms pushed on girls throughout the early years of life is for participant 3 considered as one of the reasons behind why women blame themselves after an abuse. She elaborated, *“women are raised to not make a big deal of things like abuse, when we grow up, we are taught that some abuse is just to be accepted as a little fun and to not make such a big deal out of it”*. This thought of “just accepting things” is also mentioned by participant 6 who contemplates on how some abuse seems to be considered more serious than other and that female stories are often brushed over:

“It is engrained in society that if someone catcalls you or physically abuse you, women should just brush it off. People tend to rubbish the way women feel and say that they are so in their emotions and overexaggerating our feelings”.

Apart from fearful feelings of stigma, judgement, self-blame, and resignation, coming out with or reporting sexual abuse are for many highly challenging. We discuss these challenges in the second theme below.

Sexual Violence Justice – Choosing the right path

In general, when injustices occur, the legal justice system is what victims rely on to find justice. However, for individuals with experience of sexual abuse the legal system often seems daunting and unsafe and during our interviews it became apparent that most felt overwhelmed by the prospect of striving for legal justice. Participant 1 considers the negative consequences of reporting an abuse: *“It takes a lot of will-power to stand up against an abuser... is it really worth reporting to the police for the energy it takes?”*. Participant 2 extends this reasoning by reflecting on the expected gain of such a decision:

“The laws when it comes to sexual abuse have proven to be insufficient. The punishments for sexual crimes that we have here are crazy low and that means victims will never feel like justice has been obtained. That, in combination with the extreme push it takes to report someone just to have your abuser go in for a

ridiculous [short: authors remark] amount of time, would make any victim hesitant to report”.

Several respondents also mentioned being unsure about what to expect from a potential trial. This insecurity made some of them hesitant to report, thinking that the process could cause them even more harm. According to participant 15, such perceptions of trials and legal processes stem from reports in newspapers and tv about sexual abuse survivors, she explains: *“When you see how defense lawyers really go after the victim you see how you don’t want to be put in that spot.*

Insights on legal justice were often brought up alongside thoughts on the shortcomings of the justice system. Participant 6 considered the justice system to be *“...inherently unfair because it is not shaped for sexual abuse”*. Participant 2 shared the same view and emphasizes how everyone should be treated equal in a court of law, stating: *“when it comes to crimes of sexual nature towards women, we are not treated equal in the legal system”*. The road to legal justice is hard and there are rarely long sentences for abusers. This led many participants to consider how justice was not fulfilled if their abuser is put in jail. Another reason to consider other courses of action, than going through the legal system, is brought up by Participant 11 when saying: *“just because an abuser is put into jail doesn’t mean justice has automatically been served”*. Participant 14 shares the same line of thought and wants more than a verdict:

“To have an abuser punished in the justice system is not enough, it’s not the end of the story, any victim will have to live with the memories of what happened”

As many participants described the justice system as *“not working” (P3)*, *“not working for women” (P1)* and *“not working in many cases” (P5)*, some aspects were pinpointed as being important to urgently address. When abuse happens to children or young individuals many hesitate to report because of the distressing and stigmatizing nature of such abuse, and it is common for such individuals to wait many years before sharing their experience. This can create problems since, for many of these crimes, the prescription period has run out, meaning that the injustice done can never be resolved in court. Participant 8 reflects on how this is a major problem for women *“The prescription period is a problem because when women finally have the courage to press charges, then it’s like the crime has no value anymore”*.

As discussed by many of our participants, the justice system is rarely sufficient when it comes to supporting women with sexual abuse experience and helping them obtain justice. Instead of explicitly centering on legal justice several of our participants reflected on alternative paths to justice. These paths can consist of finding support from a community or getting psychological support. We move to discuss alternative paths towards justice below.

Sexual Violence Support – Pathways to Justice

One aspect that clearly had a positive effect on our participants' recovery was the sense of community and belonging. For participant 1, being part of a community, such as an online forum, prompted feelings of *“empowerment”*. Some participants even consider the sense of community as an important part of getting justice. Participant 9 commented on how *“Justice*

is to have community and support, it's in knowing you are not alone". Similarly, participant 14 emphasized how "community and emotional support is an important part of justice". Having a community to rely on could also be a crucial part of feeling comfortable enough to share an abuse experience and potentially heal. When discussing the value of community and support many participants express that this is not only a component of justice but that it is actually a right. Participant 2 talks about how "emotional support is about human rights". Participants also make the point that when a person has been abused, they should have the right to get support through either psychologists or support groups. Participant 13 extends her thoughts on how support can help a person move on from an abuse.

"Support is important for the person who has experienced abuse...Somehow you have to be able to move on even if no process of justice takes place".

The thought of having a community where people genuinely listen to you is by participant 12 considered as an alternative way go get ratification if the abuser is not convicted. She says: "Justice can look different, even though no one is convicted, you can still have a sense of rectification by having people listen and choosing to believe you". Since legal justice is hard to obtain for the abused, often with difficult evidence situations, stigmatizing procedures and low punishments for the abuser, participants discuss the importance of a community in the aftermath of an abuse. Participant 12 reasoned that justice is not only provided by an abuser ending up in prison but can also come from people genuinely listening to you and acknowledging your experience. She said: "Justice can be expressed in different ways. Even if the abuser isn't convicted you can have rectification by telling your story, having people listen and choosing to believe you." The aspect of "others around you" is also brought up by participant 14 who stated the following: "Community is such an important dimension of justice as well as emotional support, a part of justice is to be looked after by others". As we can see from these discussions it becomes evident that legal justice isn't the only kind of justice. In fact, an abuser going to prison for a short time can even be considered as less valuable, and not worth the process of going through the tedious process of reporting. As brought up by our participants, having access to a community, offline or online can not only be justice but can also be the start to a journey of recovery.

Sexual Violence Prevention – The Ultimate path to justice

As the issues of sexual abuse are both caused by the actions of abusers and by socio-political structures, a broad conversation was held with participants about how to prevent sexual abuse, both on an individual and societal level. Some participants described how women often blame themselves and make certain changes to their behaviors, to not be abused again. According to participant 16, she started dressing and acting differently when going out to make sure men would not feel attracted to her. She stated:

"I started protecting myself by not wearing short skirts and started to wear jeans instead and it worked great, I also started to give people bitchy-looks to make sure I'm not getting into a weird situation".

These types of behavioral changes were considered by participant 7 as survival skills and clarified as: "... survival skills to adapt to the stigma and guilt from abuse". Participant 6 does

not suggest behavior change, but rather an altered mentality for women in that they should develop *“thick skin to stand up for yourself”*. While some participants describe having changed their behavior, to prevent abuse, others had an opposing, or complementary, view that women should not change at all. Participant 5 meant that: *“Women don’t have to change a thing; women are not the problem”* and participant 6 discussed how: *“most times women sit around trying to change but that’s not where the problem lies”*.

While the responsibility of combatting sexual abuse was discussed at length, participants also provided their insights on specific measures needed to prevent such abuse and move towards a just society. Some of the measures needed to prevent sexual abuse were according to participants education, economic support, access to supporting communities and information campaigns. One of the main measures considered was education due to how it could both prevent abuse and the stigma that surrounds it. Specifically, many participants pointed towards the value of sexual education for younger children. This education should, according to participant 1, focus on *“teaching children and young people about the layers of sexual relations and abuse”*. Participant 2 extended this thought and commented on how *“value basis is very important and sexual education that teaches children about the right to their bodies”*. Participant 10 highlights questions of consent and children’s rights and according to her, these aspects are understated in society today as it is expected of children to immediately know and understand when they have experienced sexual abuse. She continued by stating how such expectations, of being able to concretely articulate an abuse, only places more blame on any child with such experience. She clarified:

“How can we expect that people will know and understand an abuse? Can we really put that responsibility on for example 15-year old’s and believe they will automatically know and understand what has happened? I don’t think that’s reasonable, because I certainly didn’t ...”.

Besides understanding what an abuse is, participants also emphasize the importance of trusting girls and women when speaking up about abuse, instead of directly putting blaming them. According to participant 12, this is also something that should be brought up in education for both adults and children. She elaborates on the topic accordingly: *“Society puts so much guilt on women, what they did, how they looked... This is something we need to focus efforts of education on during the early ages”*. The importance of believing girls and women, was also discussed by participant 11: *“Already in the early years of life, girls should be told that they will be believed if they come out to share how something awful has happened”*. In parallel with making changes to education, information and awareness campaigns were also considered valuable. Participant 5 considered such campaigns as important to increase awareness about sexual abuse in society and elaborated as follows: *“awareness is important to remove the responsibility from women and girls when it comes to abuse”*. Such campaigns could also strengthen women and perhaps provide them with courage enough to act on an abuse or lay the foundation for *“creating a better dialogue around sexual assault”*, as mentioned by participant 10. Another aspect that could be highlighted in campaigns is

consent, or more specifically *“discussing consent and how it can change during sex”* (Participant 9).

Even if education and spreading awareness were the top measures according to participants, some also addressed the need for practical improvements, for example governance models and service delivery. For participant 2, society needs to offer more emergency housing for women escaping their abuser and to provide more *“concrete support to be able to report abuse”*. Similarly, participant 11 considered *“sanctuaries and refuge for extreme cases”*, while participant 4 recommended increased overall safety and improved routines to support abused women: *“There has to be guarantees that the support you are given is safe and that good routines to help those who press charges are in place”*. Participant 3 elaborates on how additional financial support needs to be made available independently of the current ruling political party. She states: *“There should be a large post in the city budget for women who want to press charges on their intimate partners”*. As outlined above, participants suggest measures that could prevent or support women in cases of sexual abuse. These measures, in brief, encompass supporting children in developing their integrity, educating young individuals about abuse, sexual health and stigma, and to provide additional financial, and emotional, support for those abused. It is worth noting that some measures are meant to improve the situation for women in the short-term, while several long-term measures are also suggested. Such measures that support prevention are essential to achieve substantial social change.

From our above presented results including our four themes 1) Sexual Violence Aftermath, 2) Sexual Violence Justice, 3) Sexual Violence Support and 4) Sexual Violence prevention we come back to our aim in exploring how digital technology can support independent paths to justice for victim-survivors of sexual violence. In doing so we come back to social justice and the four domains of power to contextualize how our results can be used to shape HCI initiatives for socio-political change to address gendered violence.

Discussion

Social computing and HCI research frames sexual violence towards women as prominent, challenging and especially urgent (Andalibi, 2016; Andalibi et al., 2018; Bellini, 2023; Chandrasekharan et al., 2017; Dimond, 2011). While much HCI research has come to focus on how technology can support various aspects of recovery, community and legal justice (Andalibi, 2016; Andalibi et al., 2018; Randazzo et al., 2023), the many complexities of sexual violence make it hard for women to process and obtain a real sense of justice. Moreover, because of the stigmatic nature of sexual violence many women also face for example victim-blaming rhetorics, guilt from authorities and re-victimization when pressing charges (Henry & Powell, 2018; Saha et al., 2024; Schnittker, 2022). To address these complexities, we have explored how digital technology can support independent paths to justice for women with

experience of sexual violence To address our aim, we elicited a two-part data collection consisting of surveys and interviews. Through 23 survey answers shaping the questions for 16 interviews with women who have experience with sexual violence we summarized four themes consisting of 1) Sexual Violence Aftermath, 2) Sexual Violence Justice, 3) Sexual Violence Support and 4) Sexual Violence Prevention.

We now move to discuss how our results taken together shows a multitude of ways for digital technology to support independent paths to justice for women who have experienced sexual violence. We do this coming back to social justice as a way to, 1) support victim-survivors in their own path to justice and 2) discuss needed socio-political change to address gendered violence. Lastly, we re-visit the four domains of power to contextualize how our results can be used to shape HCI initiatives for socio-political change to address gendered violence. The main contribution of our study extends the body of social justice research in HCI establishing sexual violence as a particularly complex issue due to its many social and cultural nuances which demands particular sensitivities and considerations in accordance with previous research (Öhlund & Almeida, 2023; Rabaan & Dombrowski, 2023; Sultana et al., 2018, 2022).

Supporting Paths to Justice

When working with questions of gender-based violence it is important to not only address direct issues at hand, but to widen the perspective and center the core issues of harmful socio-political structures (Bellini, Strohmayer, et al., 2019; Strohmayer et al., 2017). This widening of perspectives interlinks with social justice as a way to understand how certain challenges, in this case sexual violence, are the direct cause of longstanding structural injustice. By acknowledging the broader and more abstract issue, interventions for justice are better guided according to for example Sultana et al (2022) and Strohmayer et al (2019).

It is evident, both from previous research (Maeng & Lee, 2022; Park & Lee, 2021; Quadara, 2008) and our study, that sexual violence is inextricably interlinked with feelings of stigma, shame and guilt. Through our interviews participants cemented that stigma and guilt from sexual violence was not to be treated as a “side effect”, or something that’s only happens to a few individuals. Rather it should be treated as a main characteristic of sexual violence affecting any process of recovery and justice. As many of our participants reported stigma and fear arising after the physical situation of violence, they felt that the following psychological strains could never be separated from their experience. Similar discussions on stigma can be noted in Andalibi et al (2018) where authors mean that victim-survivors of sexual abuse often fear negative reactions even from their close friends and family. Similarly, in Miller et al., (2011) stigma from sexual abuse is discussed as a major threat towards any victims survivors recovery and health.

To address the many challenges of the stigma following sexual violence we argue that digital technology could be used to support victim-survivors in a multitude of ways. Support could

for example center websites on stigma-relief, education towards anti-stigmatic language for family and friends or information regarding the importance of positioning stigma as an inherent part of sexual violence recovery. Making such support available on a large national scale can be part of alternative paths to justice.

Obtaining legal justice from sexual abuse is a highly complex and intricate process which demands a lot of energy from victim-survivors. Many of our participants describe the legal process as tiring, abstract and insufficient for justice to be fulfilled. Occasionally, searching for legal justice could cause further harm as reported by Rabaan, (2021) and physical violence as reported by Ahmed (2019). While sentencing of an abuser and short-term support is the only type of justice available by governments, we argue that digital technology has the potential to support women in making more informed choices about whether or not to report sexual violence to the police. While we recognize the importance of official reporting, other paths can be supported by digital technology. These paths as highlighted by our participants could for example be education on how to take responsibility as a person who committed sexual violence, larger social opportunities of emotional recovery or forums for empathic discussions of sexual violence experiences.

Moreover, according to our participants, the sexual violence justice process seldom ends at the moment of conviction. Instead, participants center how easy access to support services is of the utmost importance for victim-survivors to process their experiences. We also note how our participants center belonging to a community as an important part of justice from sexual violence. To be looked after by others, to be believed and to share your stories is positioned as immensely important aspects to both justice and recovery according to our participants. Digital technology has the potential to support a sense of community for victim-survivors in a multitude of ways. While for example Andalibi et al., (2016) discuss the importance of anonymity in online platforms and Sambasivan et al., (2019) discuss community restraints we see that digital technology could also be used more systematically. By for example creating digital tools for social services and authorities to further community we are foregrounding important paths to sexual violence justice and recovery.

Together with our participants we also discussed ways to prevent sexual violence. Some discussions centered how the participants had personally changed their behavior in public by walking away or changing their clothes to quickly de-escalate a situation. These discussions were then connected to larger socio-political structures of victim-blaming ideas towards women which is also echoed by Lindqvist & Ganetz, (2020). Participants then meant that women should inherently not have to change or be responsible to prevent violence. One of the most suggested prevention methods by our participants was education. For example, education about sexual consent amongst children and youth, education about stigma and guilt from sexual abuse, and education about physical integrity for children. As educational efforts to prevent sexual violence is most urgent and important according to our participants, digital technology has the potential to support such efforts in a multitude of ways. For example,

digital tool-kits, gamification of information and pedagogical platforms and many more initiatives lies close to HCI research.

In summary, there are many ways in which digital technology could support independent and alternative paths to justice for victim-survivors of sexual violence. As discussed by our participants paths include for example, stigma-relief repositories, anti-stigmatic language education for friends and family, nationally centering stigma as a major part of sexual violence recovery, easy access to emotional support, educational tools for social services and authorities to better work with stigma and recovery and educational efforts towards youth and children. We now move to highlight how such digital support can be shaped along the four domains of power to center socio-political change needed to address gendered violence.

The Four Domains of Power

To contextualize the results of our interviews and the above discussion on how digital technology can support independent paths to justice we elicit a social justice perspective to look beyond only suggesting change directly towards victim-survivors of sexual violence. While personal paths and change is an important part of justice and recovery, large initiatives of socio-political change are equally needed working towards preventing gendered violence overall. To contextualize how our results can be used to shape HCI initiatives for socio-political change to address gendered violence we come back to the four domains of power to discuss on what social levels digital technology could intervene. We end this chapter by reflecting on the specific context of our study.

Within the structural domain we argue that stigma needs to be nationally positioned as an inherent part of sexual violence towards women (see table 2). In doing so, it is possible that society to a better extent would recognize the massive negative implication that stigma following sexual violence have. While we recognize how this might be hard to do in practice, addressing the structural domain is an important step in working with social justice. Moreover, we note how governments and social institutions should work to make the definition of justice for sexual violence broader to not only include legal sentencing for the abuser and short-term support for the victim-survivor. We mean that digital technology can support novel ideas on how legal justice in cases of sexual violence could be shaped. This should also include easy access to long-term social support both physically and psychologically while also providing communities of support. Along the structural domain, preventative actions against sexual violence should be made by large scale socio-political decisions, financial support and educational initiatives which could be supported by digital technology.

Secondly, building on the disciplinary domain, digital technology could support educational efforts within for example, police, social work and school (see table 2). As mentioned by our participants, teaching children about stigma from early ages could be one way to prevent guilt, shame, and victim-blaming ideas. These initiatives should firstly be shaped after teaching

youth to not stigmatize as opposed to teaching women or girls to not “feel” stigmatized. Along the disciplinary domain we note the possibility for digital technology to support a higher level of transparency towards the legal processes of reporting sexual abuse. By providing more exact information on what steps one is required to go through, victim-survivors can to a better extent decide for themselves how they wish to move forward. Moreover, digital technology could be used to better shape the justice systems to not be as demanding and harsh on victim-survivors of sexual violence. This would significantly help with what is often referred to as underreporting (Kelly & Stermac, 2008). We also argue that if the legal process would better include for example social support and opportunities of forming empathic communities, more women would feel safe to share their experiences which would probably lead to more reporting in the future.

For the third, hegemonic domain preventatory actions can according to our participants be taken by the educational systems for youth and children to substantially tackle insidious gendered norms and violence (see table 2). Such education could be supported through digital technology in many ways and should also include education on sexuality and consent. As discussed by Öhlund & Almeida, (2023) teaching children about bodily integrity and communication at an early age is pivotal to prevent sexual violence towards children. Within the hegemonic domain where ideas and norms are organized, we recognize how stigma could be addressed not only in the media but also in any type of community and organization where sexuality and violence are a natural part of growing up such as for example religious communities and the school system. Digital technology has great potential in the hegemonic domain to support anti-stigma initiatives. For the hegemonic domain, we agree with our participants that the idea of women having to protect and prevent their own potential experiences of sexual violence is wrong. Instead, what should be worked towards and could be supported by digital technology in the hegemonic domain is cementing other norms where violence prevention should lie on those who risk conducting violent acts.

Lastly within the interpersonal domain, we argue that digital technology could be used by victim-survivors themselves to search for safe spaces away from stigma and guilt (see table 2). Such platforms have been reported on by for example Andalibi et al., (2018) and Randazzo et al., (2023). However, there are also good opportunities for digital technology to support families and friends of victim-survivors to educate themselves on how to be empathic and not stigmatizing nor victim-blaming. Actively working against stigmatizing language and actions towards victim-survivors is a very important part of sexual violence justice. We note this through the many conversations with our participants on being told by their families that they should expect certain abuse throughout their lifetime. The interpersonal domain could be supported by digital technology through for example websites where various paths to justice from sexual violence can be explored. This could relieve victim-survivors of feeling forced to report and to make informed decisions whether they may be at risk for more violence and harm. As discussed by our participants, and by (Andalibi et al., 2016) digital technology and social media is already used by many victim-survivors of sexual violence to navigate and look

for paths to justice. While we would encourage HCI-researchers to further explore ways of for example creating and sustaining support communities, addressing the higher levels of the four domains of power is equally needed at this point in time. Lastly, within the interpersonal domain working to prevent sexual violence action should be taken by abusers and potential abusers. While this might seem immensely hard to do, it is not unheard of in HCI (Bellini, Rainey, et al., 2019). Digital technology could assist these forms of preventative actions towards sexual violence in a multitude of ways.

Table 2: Overview of adjacent socio-political change needed to lessen and prevent sexual violence against women in Sweden according to our participants

<p style="text-align: center;">STRUCTURAL</p> <p style="text-align: center;">Organizes oppression through large-scale social institutions</p>	<p style="text-align: center;">DISCIPLINARY</p> <p style="text-align: center;">Manages oppression through practices and bureaucratic rules</p>
<p>Nationally position stigma as an inherent part of sexual violence towards women, to better elicit support mechanisms</p> <p>Large scale initiatives and economic support to lessen gendered violence from the point of view of society and potential perpetrators</p> <p>Work to make the definition of justice from sexual violence broader to include larger social complexities and long-term emotional support</p>	<p>Foreground educational efforts within the legal system focusing on empathic communication</p> <p>Foreground educational efforts within early education on sexual violence, stigma, guilt, consent and integrity towards young children and youth</p> <p>Foreground larger efforts towards making the justice system better suited for sexual violence justice and a higher level of transparency for victim-survivors to make better informed decisions</p> <p>Foreground initiatives for larger social support through communities for victim-survivors of sexual violence</p>
<p>Foreground conversations and discussions on sexuality and stigma in child-close organizations</p> <p>Foreground national media strategies that includes better nuances and inclusive language in media outlets</p> <p>Foreground educational initiatives in schools that teaches families how to talk about gender norms and sexuality</p>	<p>Websites where various paths to justice can be explored anonymously</p> <p>Foreground ways of learning about empathic and stigma free language towards victim-survivors (for friends and family)</p> <p>Foreground ways of learning about how to take responsibility for actions and behaviors of sexual violence (for abusers and potential abusers)</p>
<p style="text-align: center;">HEGEMONIC</p> <p style="text-align: center;">Involves ideological and cultural norms. Shapes beliefs, norms and ideas</p>	<p style="text-align: center;">INTERPERSONAL</p> <p style="text-align: center;">Everyday interactions and experiences of oppression through personal relationships</p>

A note on our study context

As our study took place in Sweden, something can be said about how our results can be interpreted in this particular context. While Sweden is a country often claiming to be gender equal and in 2021 became the first feminist government, in Europe it is the country with the highest statistics on rape towards women (Gottzén & Berggren, 2020; Sveriges Riksdag, 2017; Swedish Gender Equality Agency, 2024). This is called the Nordic paradox where high levels of gender equality and high levels of sexual violence goes directly against each other (Wemrell

et al., 2019). While the reason behind the Nordic paradox remains unclear our participants never mentioned it as a factor directly impacting their path to justice. Sweden also has a number of services and opportunities which women experiencing any type of violence can turn to. Examples are the social services, the police, telephone support lines and non-governmental organizations. While these services are in theory offered to all women in Sweden, only one of our interview participants mentioned being helped or assisted by the services offered by the government. Based on the many conversations with our participants it became clear that most of our participants did not think that the initiatives of the Swedish government to address sexual violence and gendered violence was enough. Moreover, a lot of ideas on how to prevent sexual violence came down to national initiatives of education. In Sweden the trust in the government and authorities is high and framing educational efforts when in addressing gendered violence is a realistic idea.

Conclusions

In this study we aimed to explore how digital technology could support independent paths to justice for women with experience of sexual violence while also discussing needed socio-political change to address gendered violence. We worked alongside feminist arguments on how sexual violence against women stand for a particularly complex crime due to its invasive and stigmatizing nature (Johnson, 2017; McPhail, 2016; Miller et al., 2011; Schnittker, 2022). We moreover discussed how we would elicit a social justice perspective and the four domains of power to 1) support women with experience of sexual violence in their own path to justice and 2) discuss needed socio-political change to address gendered violence.

To explore our aim, we conducted a qualitative survey and 16 interviews with women who had experience of sexual abuse and analysed the material using thematic analysis. From our analysis and results we reported on four main themes, 1) sexual violence aftermath, 2) sexual violence justice, 3) sexual violence support and 4) sexual violence prevention. The first theme 1) sexual violence aftermath, included discussion on immediate feelings and consequences of experiencing sexual violence and focused on for example stigma and guilt from others. The second theme 2) sexual violence justice included the many difficult challenges for women who have experienced sexual violence to navigate the legal system to obtain justice. The third theme 3) discussed how communities and support was an important part of obtaining and recover justice from sexual violence. The last theme 4) sexual violence prevention discussed ways of preventing and lessening sexual violence overall.

In the discussion we came back to social justice and the four domains of power to present how digital technology could support independent paths to justice and needed socio-political change to address gendered violence. We established how there were many ways in which digital technology could support independent and alternative paths to justice for victim-survivors of sexual violence. As discussed by our participants paths included for example, stigma-relief repositories, anti-stigmatic language education for friends and family, nationally

addressing stigma as a major part of sexual violence recovery, easy access to emotional support, educational tools for social services and authorities to better work with stigma and recovery and educational efforts towards youth and children. Then we used the four domains of power to position not only the paths to justice but ways that digital technology could also support socio-political change to address gendered violence.

Through our two-part study consisting of surveys and interviews together with women who have experienced sexual violence we have been able to explore how digital technology can support independent paths to justice. Moreover by eliciting social justice and the four domains of power we have shown how HCI is an area readily available to address the complex challenges of socio-political change to address gendered violence.

Limitations

Findings, discussions, and implications from our study are based on self-identified women currently living in Sweden. The perspectives given and presented should therefore not be taken for granted as only being applicable in a Swedish perspective. The participants who came from other countries were encouraged to give any perspective. We have however been able to present new perspectives on justice, through the lens of women with experience of sexual abuse. We have further been able to identify new perspectives that should influence future social computing research in the quest of combatting sexual abuse against women. We have refrained from using the word victim which is often considered as stigmatizing for individuals who have experience of sexual abuse. Instead, we have used victim-survivor.

Moreover, as the term gendered violence is often used interchangeably with men's violence against women (Council of Europe, 2024), it is important to recognize how intersecting identities and social classifications (e.g. ethnicity, gender-conformity, religion, sexuality etc) means that certain individuals are at higher risk for violence. This risk can come from heightened marginalization, stigmatization and discrimination which means facing many challenges when seeking legal justice. In this paper we have focused on self-identified women from many various backgrounds and ethnicities and their general perspectives and experiences. We recognize how a larger analysis of intersectionality could have made our material richer in the sense that intersecting identities would have provided more nuanced perspectives.

Declarations

Before any data collection was conducted the study was approved by the Swedish Ethical Review Authority. We have no conflicts of interest to declare.

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Social Justice in HCI: Current Streams, Considerations, and Ways Forward

Öhlund, L., & Wiberg, M. (2025). Social Justice in HCI: Current Streams, Considerations, and Ways Forward. *Interacting with Computers*

Social Justice in HCI: Current Streams, Considerations, and Ways Forward

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Abstract

The expanding interest in justice-oriented HCI focusing on critical perspectives, structural oppression, and marginalization—often referred to as social justice—is reflected in a growing number of publications over the past few years. Through the continuous growth of social justice in HCI, we argue that now is a good time to provide an overview of the ongoing and current streams of social justice research. We introduce social justice as it has grown in HCI during the last 15 years followed by the most commonly framed theoretical tenets. Secondly, we construct a corpus of 60 HCI articles building on social justice as the main concept. Through our corpus we summarize and present 4 currently ongoing streams of research to further a cohesive, yet fluid understanding of how social justice is shaped and understood within HCI. Describing these interconnected streams also gives us the possibility to frame and describe the current development and move forward as a research community. Based on our study and discussions, we suggest 6 considerations for HCI researchers seeking to work with social justice as a concept, and we emphasize the need for long-term engagement in justice-oriented research to foreground and enable societal change and social good. Through this study, we contribute to the ongoing growth of social justice research in HCI by providing an overview of current streams and ways forward.

RESEARCH HIGHLIGHTS:

- During the last 15 years the concept of social justice has grown in HCI.
- We argue that now is a good time to provide an overview of the current streams and ways forward.
- Through a scoping literature we analyse 60 articles explicitly engaging in social justice.
- We identify four current domain streams to function as a heat map of where social justice is being conducted in HCI.
- We suggest six social justice considerations for HCI researchers and emphasise the need for engagement to foreground social change and social good.
- We contribute to the ongoing growth of social justice research in HCI by providing an overview of current streams and ways forward to foreground a cohesive and fluid understanding of the concept.

Keywords: HCI; Social justice; HCI theory; Concepts and models

1 INTRODUCTION

HCI has been through a transformative shift in recent years, with an increased uptake of principles and perspectives from social justice and parallel concepts such as transformative, restorative, and environmental justice (Corbett and Loukissas, 2019; Dombrowski et al., 2016; Sharifa Sultana et al., 2022; Strohmayer et al., 2019; Sultana et al., 2018). This paradigmatic shift reflects a growing awareness of critical issues surrounding digital technologies as tools of both justice and injustice including e.g. concerns about equity, inclusivity, and fairness (Sharma et al., 2023). The recognition of digital technology as a potential facilitator or mediator of both ‘good and bad’ has grown to include communities facing large social marginalization and discrimination such as racially discriminated groups, queer communities, indigenous groups, women, and children with experience of physical and sexual abuse, gentrified communities in the United States, and women living under heavy patriarchal structures (Bellini, 2023;

Öhlund and Almeida, 2023, 2023; Sharifa Sultana et al., 2022; Strohmayer et al., 2019; Sultana et al., 2018). Social justice opens up for anti-solutionist approaches recognizing how large structural challenges cannot be solved explicitly through technological interventions. HCI literature seeking to frame this concept include both digital interventions, as well as approaches that recognize how large social challenges cannot only be addressed through individual change. For example, (Sharifa Sultana et al., 2022) dissects stigma and shame towards children with sexual abuse experience instead of centering police interventions and (Strohmayer et al., 2019) builds on already existing tools for criminalized sex workers. In doing so larger insights on society and structural challenges are highlighted. To frame such challenges of structural oppression for both micro (community in question) and macro (for the large social challenge) interventions, social justice is often used as an umbrella term dealing with justice and injustice on a larger scale (Bellini et al., 2022; Dombrowski et al., 2016).

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This evolving research landscape—growing in popularity, creates a need for a conjoint understanding of social justice to prevent misaligned interpretations. We extend the arguments by (Bellini et al., 2022) in questioning non-explicit commitments to social justice and the risk to ‘run in tension with or counter the goals for co-liberation, equity and redistribution’. The point is not to gatekeep engagement and commitments toward social justice. Instead, the purpose is to build a joint understanding to highlight the opportunities of genuine commitment to social justice in HCI and to prevent misaligned approaches and short-term engagement with the concept. While acknowledging the rapid growth in this area, we contend that a long-term commitment to this strand of research is essential to cultivate a more just future for all. For sure, cultivation and processes of change and inclusion take time. Motivated by this growing area, we present a scoping overview of HCI literature that explicitly frames social justice to highlight the ongoing streams of research in this area.

To structure our paper, we start by presenting how social justice has come to grow in HCI followed by a short theoretical background. We then move to present the method and approach in creating our literature corpus. Moving forward, we present a collection consisting of social justice literature in HCI followed by an analysis resulting in four streams of social justice research in HCI. We conclude, by discussing insights from each stream and suggest 6 considerations for researchers working with social justice as a core concept. Lastly, we question how our overview and streams can serve as a useful tool for the research community.

2 SOCIAL JUSTICE IN HCI

During the last 15 years social justice has grown in HCI. Over these years it has engaged with notions of for example, injustice, oppression, fairness, equity and equality (Bellini et al., 2022; Dombrowski et al., 2016; Fox et al., 2016; Öhlund, 2023; Sharifa Sultana et al., 2022). As a passing concept, social justice is not novel in HCI, however, concrete engagement and foundational analysis was not included until the early 2010’s (Antle et al., 2009; Bardzell, 2010; Dimond et al., 2013; Fox et al., 2016). From the very beginning in computing literature, the first article in the ACM digital library—Guide to Computing Literature, explicitly mentioning social justice is ‘Computer Security—A Survey’ by Peter S. Browne from 1976. Social justice is only mentioned once in the context of privacy as a social concept (Browne, 1976). Most articles between 1975 and 2008 only mention social justice passingly, for example how computer applications may have ‘labor-displacement effects and deter social justice’ (Mowshowitz, 1984), how virtual reality in education can stimulate ‘fresh perspectives on how to promote social justice’ (Casey et al., 1998) or how ‘collaborative inquiry as a method can deploy knowledge towards social justice’ (actually in this article social justice is mentioned 4 times) (Campbell, 2004). Between 1975 and 2008, only 55 articles somehow mentioning social justice were published and it was not until about 2010 that the concept started to gain a more widespread interest. From 2016 and forward, articles on social justice become more frequent, and many authors started to define and theorize more thoroughly, how the concept can be used in for example design, interaction design, UX design and augmented reality research (Ashikoto et al., 2018; Dombrowski et al., 2016; Fox et al., 2016; Rose et al., 2018). Since 2010 social justice has been used in a plethora of variations in HCI, spanning from an umbrella concept discussing any type of larger injustice (Van Wart et al., 2014) to using it as a more specific concept, for a more specific purpose, such as transformative justice (Sharifa Sultana et al., 2022), restorative justice (Sultana

et al., 2018) or linguistic justice (Nee et al., 2021). Through the multifaceted use of social justice over the last couple of years, the concept has seen a large increase in interest which has led some researchers to raise concerns over the fast-paced development. One such concern relates to the danger in conducting research, in the name of social justice, without explicitly discussing what the concept really is about (Bellini et al., 2022). Mis- and under-representing social justice efforts can result in injustice through counter-acts of ‘liberation, equity and redistribution according to’ (Bellini et al., 2022). In this paper, by sharing and working for a common understanding of social justice attending to reflexivity and fluidity, we hope to limit the possibilities of running in tension with core tenets of social justice and reduce potential harm to communities involved in such research. Another concern, as the popularity of justice related concept grows, is that of virtue signaling where an individual expresses a certain opinion to gain moral high ground simply based on communicating a good character without any further engagement with justice. This concern is discussed by (de Castro Leal et al., 2021) and echoed by (Bellini et al., 2022) as ‘community fetishism’ where researchers attain to communities at the margins for rich data seeking career development before social change. We recognize both of these risks of misrepresenting social justice and virtue signaling through community engagement by highlighting the need for a joint common ground for HCI researchers seeking to engage in social justice research. We also build on the recently published work by Chordia et al. (2024) who systematically presents a broad overview of social justice in HCI. They take on a broad scope of justice-related literature in which we extend our scoping review toward social-justice explicit HCI literature.

As this introduction illustrates, there has been a steadily growing interest in social justice oriented HCI over the last 15 years. We also note a shift from the earlier days when the concept was often passingly mentioned, to more recent publications where social justice is an explicit object of study. Accordingly, it is now a good time to map out this growing landscape of research and identify the current research streams for further development of this area. In the following section, we describe the wide theoretical background of social justice.

3 BACKGROUND—THEORETICAL ROOTS OF SOCIAL JUSTICE

Social justice as a theoretical concept relating to justice and fair distribution of social opportunities originates from various historical sources and academic disciplines. Many attribute social justice heritage to philosophical thinkers such as Plato, Kant, and Marx in dealing with various difficult, large, and constant notions such as equality, equity, needs, and just distribution (Jost and Kay, 2010). Moving from social justice as an abstract line of thought to building and framing theory, two researchers are often prominently accredited: John Rawls and David Miller (Jost and Kay, 2010). In the 1971 book, *A theory of Justice*, Johan Rawls foreground one of the largest scholarly works aimed at a theorization of Justice. In the 538-page book, Rawls examines the role of justice in a plethora of paradigms, such as utilitarianism, fairness, morality and one of his most widespread concepts ‘the veil of ignorance’. The concept is described through a hypothetical scenario where humans have no knowledge of their position in society and would hence agree on a scheme of equal liberties (Rawls, 1971; Krawczyk, 2010). A later theoretical contribution was written in 2001 by philosopher and professor of political theory, David Miller. In the book ‘Principles of Social Justice’ (Miller, 1999), Miller expands

on the justice concept describing it as a set of context-sensitive principles that apply to different forms of human association and identifies three main principles of social justice: *desert*, *need*, and *equality*. *Desert* frames an individual's rights based on contribution, *need* entails how those in need should get more, and *equality* foregrounds an equal distribution of social benefits. Other influential literature theorizing social justice draws on similar ideas of equality, equity, need, freedom, and human rights such as American philosopher William Frankena who discusses and identifies four main criteria for assessing justice in a society: equality, need, merit, and freedom (Frankena, 1966). Another American philosopher accredited to extending ideas of social justice is Joel Feinberg who emphasizes and defends a liberal and pluralist view on justice, which recognizes the diversity and complexity of human interests and values, as well as the need for a balance between individual and social welfare (Jost and Kay, 2010).

Reflecting on who is accredited to have made substantial efforts to social justice theories in academia common denominators are white, male and western (Jost and Kay, 2010). Despite discussing notions of desert, need and equity, few engage in thoughts on intersectionality—the idea of interconnected experiences of oppression. We extend the scope of previous social justice literature and argue for other important and influential contributions, such as Black feminist thought by Patricia Hill Collins (Collins, 2000), Intersectionality as articulated by Kimberlé Crenshaw (Crenshaw, 2013), Feminist Theory by Bell Hooks (Hooks, 2000) the three-dimensional justice framework by Fraser (2009) and lastly the work on oppressive structures by Iris Marion Young (Young, 2020). These researchers, theorists and activist are often cited and positioned in HCI as core works of justice, feminism, de-colonialism, and social justice (Erete et al., 2021, 2023; Jones, 2023; Ogbonnaya-Ogburu et al., 2020; Strohmayer et al., 2019). The broad usage of multifaceted theories within social justice HCI mirrors the positive growth and development toward more inclusive and critical research.

Working with a concept, such as social justice, it becomes important not only to reflect on the future research we are conducting but also the previous research we are referencing and building on. As the concept of social justice has gained substantial traction from HCI researchers in the last 15 years, and continues to grow, we move to present a scoping overview of HCI literature framing social justice to highlight the current ongoing streams of the area. We do this to build a joint understanding highlighting the opportunities of genuine long-term commitment to the social justice concept.

3.1 Methodology and process

Despite the fairly short history of social justice oriented HCI, over the last 15 years there has been a significant number of papers published that demonstrate a broad interest in this area, and a growing concern for questions dealing with structural challenges of oppression. To capture key literature in this growing field, we prioritized working toward an initial scoping review of literature pertaining explicitly to a social justice concept. Through a scoping review methodology, we had the possibility to present a broad overview of the topic, examine the emerging area and clarify concepts (Tricco et al., 2016). Similar approaches can be seen in articles where researchers in HCI have sought to summarize and highlight concepts such as sustainability (DiSalvo et al., 2010), embodied interaction (Lee-Cultura and Giannakos, 2020), and time and temporality (Wiberg and Stolterman, 2021). Moreover, we build on the recent work by Chordia et al. (2024) who attains to a systematic literature review on articles discussing social justice

as an umbrella term aligned with parallel concepts, such as transformative, reproductive, and disability justice. As their work summarizes, for example, the harms and benefits centered in social justice HCI and key considerations on how to think about justice-related questions and concerns we extend their work in a few keyways. Through our smaller scoping review, we highlight HCI literature that articulate explicit attention to the concept of social justice. Furthermore, in difference to their description of common harms, benefits and approaches, followed by tools for equitable processes, we summarize 4 currently ongoing streams to highlight a sort of heatmap where most work is conducted. Lastly, by providing an overview of research which explicitly engages in a social justice concept, we hope to facilitate a larger conversation on what social justice commitments entail and the opportunities of a shared understanding as also highlighted by (Bellini et al., 2022; Chordia et al., 2024).

To start building our literature corpus we conducted a keyword search of ('social justice') in the ACM digital library—Guide to Computing Literature, which is 'the most comprehensive bibliographic database focused exclusively on the field of computing'. Through our first keyword search for ('social justice') proceedings on June 18, 2024, we obtained 150 results (see Figure 1). We downloaded all the results into Zotero and imported the list into a word table for easier overview. In similarity to Chordia et al. (2024) and DiSalvo et al. (2010) we elicited a number of criteria to further refine our corpus also called 'reporting guidelines'. Criteria and reporting guidelines are used as a way of making the methodological approach within a scoping review more transparent (Tricco et al., 2016). Throughout this paper, we use the word *criteria*, more common in HCI when describing iterations of analysis (DiSalvo et al., 2010; Chordia et al., 2024). From the initial 150 keyword results, we created two criteria to ensure that each paper had a strong conceptual connection to social justice beyond the keyword. There were 6 papers which we could not gain access to and for those reasons we excluded them not because of their disconnection to social justice, in which we could not analyze but because of their inaccessibility. This made our total number of proceedings 144. For our following criteria analysis, we excluded any paper which did not (1) Engage with the concept of social justice beyond the keyword or references and (2) Use social justice as a primary concept for the work. For example, is the concept discussed in related research, background, or used as an approach? In for example, (Westbrook, 2015; Payton et al., 2019; Pritchard et al., 2020; Tushar et al., 2020) social justice is not attended to more than in the keyword and although the research topics are highly relevant for social justice research (sex-trafficking equity, inclusion, queer, and feminist theories) for our scoping review we only sought works that explicitly engaged with social justice as a concept. In some cases, we also removed any paper which although mentioning social justice, did not have the space to further engage in the concept due to the format of the proceeding such as short workshop papers or abstracts (Barnard et al., 2021; Wieczorek et al., 2023). However, due to social justice being an abstract and complex concept, we recognize how papers can still be of a social justice nature, and for this purpose, we highlight the broader work by Chordia et al. (2024).

The first author of this paper conducted the initial criteria analysis on the 144 proceedings. By going through each result one by one and searching for social justice in the text, the first author marked down 56 papers as initially passing the first and second criteria and 17 papers marked B for borderline. Seventy-one proceedings were removed based on their disconnection from the criteria. The borderline papers passed the first criterion. But

did not clearly pass the second. The two authors discussed the 17 borderline papers, and in the end 4 of them were selected for the final corpus consisting of 60 papers.

From these 60 papers, we initially grouped papers sharing a domain and interest. We did this as to get a better overview as to the most common ongoing streams of social justice research in HCI. The corpus was divided into 4 domain and interest streams (1) Social Justice-Oriented Design Research, (2) HCI For Larger Social Justice Initiatives, (3) Technical Communication For Social Justice and (4) Social Justice in Computer Science and Engineering.

Secondly, we developed a scheme of questions similar to DiSalvo et al. (2010) guiding our analysis of each paper. To create the questions, we sought to frame both a cohesive understanding and plurality in the multidimensional usage of the social justice concept in HCI. The questions had to both be straightforward enough to answer and open enough to not discard explorative work. The questions were as follows: (1) How does the paper position and define social justice? (2) Is there a particular type of social injustice? (3) In what ways is the paper engaging in critical perspectives of structural injustice? (4) Is social justice used as a definitive goal or a way of analysis? (5) Who is supposed to take action against the framed social injustice? (6) Are the contributions of the paper aligned with social justice long-term engagement? For each paper, the first author wrote a small summary relating to the questions. Through these summaries, we critically examined and discussed each question working back and forth between our 4 domain streams and collection of papers. Many papers overlapped into another stream, however, to create a more cohesive idea of each domain and interest stream, we decided to place each paper in only one stream. In streams where this was the case, we provide arguments for our choices of placement. Below, we move to present the four most noticeable domain and topical research streams of explicit social justice HCI research.

4 ONGOING SOCIAL JUSTICE STREAMS

Hegemonic domination and structural oppression have engaged many HCI researchers in the last 15 years and social justice has emerged as one way to frame often complex and abstract social challenges. Despite the broad engagement with concepts of oppression and injustice in HCI, social justice is rarely used coherently in existing literature. By summarizing and presenting the ongoing streams of (1) the most common domain and topical interest and (2) how they engage in social justice, the purpose is to provide a cohesive, yet fluid understanding of how social justice is currently shaped and understood throughout HCI. Describing these streams gives us the possibility to frame the constant movement forward and common change in direction for social justice.

4.1 Stream 1: Social justice-oriented design research

Emerging as one of the major and oldest streams of social justice HCI, noted through our corpus are design-oriented studies in HCI consisting of 17/60 papers. Related to this stream we collect literature on UX-design, interaction design, augmented reality and makerspaces for design. Much of the social justice literature centering design builds on the paper and predecessor 'Social Justice-Oriented Interaction Design: Outlining Key Design Strategies and Commitments' by Dombrowski et al., (2016). The article is among the first in HCI making a substantial effort digging deeper into

social justice to provide a better contextual understanding for interaction design. As a challenge for the technological paradigm is to explore how social justice specifically aligns with design, the article positions social justice as an orientation consisting of a 'constellation of modes and sensitivities' which includes framing a reflexive commitment to design processes. By treating social justice as an orientation and a 'horizon to work towards' instead of, for example a goal, authors incorporate a more reflexive view of justice as an ongoing process instead of a static utopian future achievable through technological solutions. We recognize the value of treating social justice with reflexivity and openness, as stated by Dombrowski et al. (2016), due to its multifaceted usage. By not establishing a static definition, researchers minimize the risk of one-sided and short-sighted commitments. Playing into this plurality is also the notion of 'wicked problems', characterized by Dombrowski et al. (2016) as societal challenges without clear solutions often in need of political and structural development. Wicked problems as abstract societal challenges without clear definition nor solution mirror the importance of fluid and plural understandings of social justice to better address social complexities. As discussed by Dombrowski (et al., 2016) and in extension Lötter (Lötter, 2011), social justice is seen as an orientation in constant flux, an everchanging flow of multi-dimensional lived experiences informed by for example history, identity, class, race, gender and ability. As one of the first major works on social justice-oriented design in HCI, many authors have used the Dombrowski paper as their theoretical underpinning, both within the larger design area as well as in other domains such as augmented reality, socio-technical gentrification, food democracy, gun-violence prevention and digital tools to fight stigma (Strohmayr et al., 2017; Ashikoto et al., 2018; Prost et al., 2018; Samuels et al., 2018; Corbett and Loukissas, 2019; Pendse et al., 2021).

In congruence with the work by (Dombrowski et al., 2016), feminist ideas are often attended to in order to frame a larger theoretical scope. Through our corpus and within this stream, we have noted how for example, intersectionality articulated by Kimberlé Crenshaw (Crenshaw, 2013), feminist theory contextualized toward HCI by Shaowen Bardzell (Bardzell, 2010), and the design justice framework by Sasha Costanza Chock (Costanza-Chock, 2020) are literature included to frame a larger scope of interconnected design thinking, feminism and social justice (see: Kannabiran et al., 2018; Tham, 2019; Tseng et al., 2020; Pendse et al., 2021).

Various approaches are taken to interconnect the areas of social justice and UX-design. For example Acharya (2018) frames contextualized UX-design in resource constrained settings as a way to promote social justice while Rose (2016) positions it as a methodology to frame UX toward marginalized communities. For this design-oriented social justice stream, UX-design is considered a way to 'advocate for users' (Walls, 2016) and as having 'maximum impact on marginalized populations through application development' (quite the statement!). The papers in our corpus discussing UX-design and social justice occasionally positions UX as a component of eventually reaching a state of social justice. When treating social justice as a utopian goal for research it is easy to reproduce solutionist arguments that technological interventions can solve complex social problems. We wish to make authors aware of the risk of such solutionist thinking, and instead note the possibilities of attending to the many frameworks and ideas of social justice already being discussed in HCI such as (Bardzell, 2010; Costanza-Chock, 2020; Dombrowski et al., 2016). In doing this, researchers more constructively articulate their intended

meaning of social justice and frame a reflexive understanding instead of an un-reachable goal.

As social justice proliferates for designerly work in HCI, we have documented that some papers posit the concept in knowledge and network building in which we acknowledge as a great opportunity to frame long-term engagement to social justice and its development in HCI such as (Antle et al., 2009; Fox et al., 2016, 2017; Oden Choi et al., 2020). Moreover, by seeking to foreground a broadened discourse on social justice in HCI, workshops, short abstracts and panels are a common format to gather researchers and authors. Through for example, workshops, authors can see a value in social justice to encourage easier and more accessible conversations about adjacent topics, such as feminism, anti-colonialism, health technology, and critical design (Kannabiran et al., 2018; Tham, 2019; Gui et al., 2023). Centering research around future suggestions, implications and directions is common for social justice-oriented design research, where much work attends to a long-term commitment in seeking to shape the HCI community toward a more just future for all. This can be seen in for example Prost et al. (2018) where authors discuss how design with local food networks to strengthen food democracy, in Tham (2019) on how to elicit feminist design thinking to better include traditionally marginalized groups, or in Tseng et al. (2020) on how structural social problems need attention when trying to improve the lives of marginalized workers through technology.

For this first domain stream, (1) *social justice-oriented design*, it becomes evident how design is no stranger to the social justice field. Not only is there much empirical literature, but authors have also moved to develop theories specifically aligned with design and social justice such as in (Dombrowski et al., 2016). Therefore, we highlight design as one of the larger HCI domains engaging in social justice work and how a majority of this work positions long-term engagement—which we argue is of significant importance for the HCI field and its future development.

4.2 Stream 2: HCI for larger social justice initiatives

Moving from the manifold usage of social justice in design, we are now taking a turn to HCI research which in different ways uses social justice as a lens to explicitly frame complex social challenges such as but not limited to, poverty, trans rights, class, fat positivity, racism, older adults rights, sex-worker rights and gentrification (Edenfield et al., 2021; Corbett and Loukissas, 2019; Jonas et al., 2024; Lan Fang, 2022; Öhlund, 2021; de Santana et al., 2024; Strohmayer et al., 2017). With the surge of HCI research seeking to address historically rooted challenges and injustice, social justice has grown as an approach within this critical paradigm which stands for 16/60 papers from our corpus. For this stream, we include research which first and foremost share the common interest of structural change framed through technology (see Edenfield et al., 2021; Corbett and Loukissas, 2019; Öhlund, 2023; Strohmayer et al., 2019). This is a common horizon amongst all our streams as it is one of the main pillars of social justice. What sets this stream apart from for example, design is that the research included often report on large structural and historical issues first and secondly discuss how technology and social computing can attain to these challenges. We note the difference between stream (1), where often the design and development of an artifact are the main goal at the beginning of each project. For this stream, outcomes and implication for structural change are often discovered throughout the project together with participants looking for structural change such as in (Chen & Bergholm, 2020; Öhlund, 2023; Strohmayer et al., 2017).

By framing for example gentrification, the phenomenon of forced displacement of urban communities by wealthier property investors, HCI have the potential to address the complex challenges through a social justice analysis (Corbett and Loukissas, 2019). At first glance one might consider HCI-scholarship and gentrified communities as two worlds apart, however early HCI work established how the world of technology does not stand apart from the physical world (Dourish, 2006; Harrison et al., 2007). By recognizing how the technological realm does not act in isolation from the lives of humans and in extension the oppression of human lives, social justice provides guidance in analyzing the larger frameworks of injustice. Furthermore, in Strohmayer et al. (2017), authors frame sex work and aid organizations as domains where intricate relationships of legal frameworks, social stigma and discrimination dominate. Through a social justice lens, it becomes possible to address this complex field and highlight the relevance of technological interventions. This is also explored in the context of highly exposed social media moderators in Steiger et al. (2021).

Moreover, we note that some authors incorporate discussions on democracy as part of a social justice concept. In for example Karotis and Mir (2020) authors explore the dangers of 'black boxing' algorithmic governance and frames participatory methodologies and a social justice lens as a part of bettering transparency and democracy. Similarly, Johnson and Crivellaro (2021) bring together a panel of 'distinct citizens' to create discussions on social justice HCI research proposals to foster civic engagement. This type of participatory approach is common within social justice for HCI to better include marginalized communities as a way to bring in voices who have structurally been left out from society. These voices come from a multitude of communities and are often positioned as essential to include when researching social issues which affects them (Rabaan, 2021; Lan Fang, 2022; Öhlund, 2023; Jonas et al., 2024). One such group in which many papers of this stream attends, is the older adults/senior community. When discussing technology use during COVID-19 among older adults, Öhlund (2023) argues that a social justice orientation can help researchers stay away from ageist arguments on how seniors always need to adapt to technology to live better lives. Similar arguments are presented by Sixsmith (2022) which discusses a social justice rights-based approach to AgeTech development, and by Lan Fang (2022) which discusses social justice disparities which can increase vulnerability of older adults.

In this stream, we also find papers which takes a larger grip on the HCI social justice community in for example providing one of the first larger literature reviews on the topic foregrounding a broader cohesive scope of the concept (Chordia et al., 2024). We also find papers discussing common pitfalls such as shortsighted goals and virtue signaling of the social justice concept (Bellini et al., 2022). What moreover unifies this stream is that the larger take on society and structural oppression through social justice often comes with realizations and conclusions on how big and complex challenges need equally complex attention and intervention. In for example de Castro Leal et al. (2021), authors describe how the social justice turn in HCI often foregrounds a complex activist stance, discussing possible ways forwards to 'contribute to a more just world'. In addition Klassen (2023), frames her future social justice research project to attune 'disenfranchised communities' while Marks and Stanfill (2023) seeks to provide initial steps toward a multidisciplinary field called 'social justice informatics'. This field would bring in a better composition of social justice toward all areas on information and technology as they build on the ideas by philosopher Iris Marion Young in that

'as long as an inhabitant of this world suffers institutional domination and oppression, they are a legitimate subject of justice'.

In summary of this second stream (2) HCI for Larger Social Justice Initiatives, we have discussed work that first and foremost bring in seemingly un-technologically related issues such as gentrification, sex work, racism, sexism, ageism and many more topics relating to structural oppression. This stream brings in arguments of participatory practices, democratic rights and long-term goals for a better world highlighting the importance of socio-political development together with socio-technical means.

4.3 Stream 3: Technical communication for social justice

This third stream, which makes up for 17/60 papers of our corpus consist of literature which mostly attends to the technical professional communication (TPC) domain. For this stream we went back and forth between papers in which many could fit in other categories. One such example is [Ganguly \(2021\)](#) in which we first sought to put in the second stream due to its scope on reproductive justice. However, after carefully reading the paper, contributions were centered toward TPC scholars in particular and not HCI in general. Hence, we have sorted the paper in this third stream. TPC attending to social justice often foreground the concept through engagement in reflexive practices of domination and injustice ([Bay & Ruiz, 2020](#); [Swacha, 2022](#)). These more open practices can for example be obtained through a substantial inclusion of marginalized and under-represented communities which reveals a common approach for TPC and social justice work ([Bay & Ruiz, 2020](#); [Rose, 2016](#)).

We quickly note that most papers of this stream base their understanding of social justice from the book 'Technical Communication After the Social Justice Turn' by Walton, Moore and Jones ([Walton et al., 2019](#)). The book discusses how social justice has grown in TPC research and positions conceptual understanding and the 4R's (recognize, reveal, reject, replace) framework to recognize how TPC can be part of but also work against oppression. In referencing this social justice framework of the 4r's we note a multitude of papers discussing for example activism on twitter for reproductive and institutional justice ([Ganguly, 2021](#); [Jones, 2023](#); [Jones, 2021](#)). We note the paper 'Mapping Out the Core Constructs of Social Justice' ([Ojedele-Adejumo, 2023a](#)) which explicitly seeks to build on [Walton et al. \(2019\)](#) 4R's model to conceptualize justice for the TPC field. The same author critiques [Waltons and Jones](#) in arguing that emancipation as a form of social justice is rarely included in relevant literature building on their framework ([Ojedele-Adejumo, 2023a](#)).

In discussing TPC pedagogy, or 'TPC for the classroom', the [Walton and Jones](#) book is used to frame conversations on social justice, marginalization, disempowered communities and critical reflection ([Flanagan, 2020](#); [Bay & Ruiz, 2020](#); [Marks and Stanfill, 2023](#); [Swacha, 2022](#)). In for example [Lane \(2018\)](#) authors draw attention to social justice as a way to address the complexities of 'writing for the public'. By using design thinking to draw attention to 'unconventional topics' such as criminal justice, they discuss TPC student courses with the potential to become socially engaged. Additionally, to the TPC contextualized theory and framework by [Walton et al. \(2019\)](#) we note how other social justice related theories are often incorporated in this literature such as systemic oppression by [Iris Marion Young \(Jones, 2023\)](#), [Martha Nussbaum on human Integrity \(Ojedele-Adejumo, 2023a\)](#) and social justice-oriented interaction design by [Dombrowski \(Ganguly, 2021\)](#). Moreover, [Rose and Walton \(2015\)](#) argue that using a lens of posthumanism can contribute to the social justice

turn in TPC, while [Smith \(2023\)](#) seeks to bring in a larger scope of feminist methodologies to guide TPC scholars 'towards justice'.

For this third stream we note that in TPC, it is not always clear what authors mean when engaging in a social justice concept. In for example, [Stevens \(2022\)](#) social justice is discussed as issues, perspectives, and something than TPC can enact. Similarly, in [Tang \(2020\)](#), authors discuss social justice both as problems and as a concept which can be advocated for when designing automatic writing technologies. This type of scattered usage can also be seen in [Flanagan \(2020\)](#) where social justice is described as a methodology, something to be advanced and a type of issue. By drawing on experiences of women exploring user centered approaches for home pregnancy tests, social justice helps to shape research and outcomes in ([Opel, 2014](#)). Authors explore how social justice can be promoted through their research and despite not providing an explicit definition or deepened argument on what the promotion of social justice means, authors discuss the potential power of the health and medical industry to 'affect a just means of distribution of social goods to all user, including users who are not normatively recognized' ([Opel, 2014](#)). This connection to distribution as a means of justice is common and dates back to many original tenets of social justice as seen in ([Frankena, 1966](#); [Miller, 1999](#)).

Through our literature corpus we understand that social justice is on the rise in TPC literature as it makes up for 17/60 papers, with theoretical development in the form of books and papers, more published material on the topic and building on related social justice literature. This development seems to follow along the same pattern as in stream one where social justice has seen a larger theoretical interest only a few years earlier than in TPC. We see this as a positive development and note the many opportunities of creating a joint understanding of how social justice can be used for long-term commitments toward equity, fairness and justice in both HCI and TPC.

4.4 Stream 4: Social justice in computer science and engineering

For this fourth stream we bring together literature which lies at the intersection of HCI, computer science and Engineering and makes up for 10/60 papers. Most literature attends to educational approaches in computer science to engage students with social issues and explore how the computing field has a growing responsibility toward complex social challenges. For example, [Van Wart et al. \(2014\)](#) describes an after-school course focused on computer science learning with real world social justice challenges. Comparably, in the paper social justice is a highly mentioned concept used in discussing engineering students' engagement with social justice issues. [Jiménez et al. \(2019\)](#) centers [Gutstein's \(2012\)](#) notion of a *social justice pedagogy* and [Fraser \(2009\)](#) idea of three-dimensional justice. These frameworks assist students to critically reflect on social issues in their community which can according to the authors be a challenging connection to make.

[Ferreira and Vardi \(2021\)](#) highlights the importance of educating CS students on 'the large-scale social implications of their actions' and bring in discussions on the ambiguity of the social justice concept however concretizing that working toward any justice should include justice for all. Parallel arguments of critical education in cs can be seen in ([Mayhew and Patitsas, 2023](#)) seeking to 'enact social justice' in the classroom, in ([Padiyath et al., 2024](#)) when discussing critical anti-oppressive approaches to cs education and in ([Fonteles et al., 2024](#)) in using a 'social justice-based framework' to explore the experiences of underserved students. Much like many other computing areas CS and CS education have come a long way in the inclusion and usage of various social

justice ideas. As described above, many authors and educators seem to have realized the weight that critical CS education can have in today's society not only on the students themselves but also the potential outcomes of future CS developments. To critically examine the initiatives of justice-centered approaches to computer science Lin (2022) seeks to bring in larger questions of socio-political values of CS, resistance of dominant computing culture and framing CS learning as a source for social justice. All in all, authors emphasize a stronger political vision for the reshaping of cs education to foreground a better and more just future for all.

Most papers have a clear idea of whom is supposed to enact or take initiative on social justice within this stream. Either it is the teachers such as in Mayhew and Patitsas (2023) and Padiyath et al. (2024) or for the students to learn and in their later career use such as in Ferreira and Vardi (2021) or Lin (2022). Even though not always clearly stating exactly what is meant by a social justice approach, framework or issue, it becomes less abstract when bringing in clear takeaways and implications. For example, in Zhu et al. (2024) authors present the Robots for Social Justice framework which is meant to give better tools for engineers to 'enhance human capabilities'. Despite never bringing in any specific theoretical framework for social justice or providing any larger defining frames, by engaging in Martha Nussbaum's 10 central human capabilities we are given a framework of guidance. Moreover, through the Engineering for social justice framework, 5 recommendations for future development and a set of questions for better guidance toward equitable futures it becomes easier to grasp what social justice entails. In a Keynote from 2017, Evans (2017) critiques CS research as male dominated and in particular badly adapted to for example female participation in conferences, academic buildings and the challenges of the academic career for women. In his keynote social justice should not only be adapted within the research field and its curriculum but something that should be visible throughout all layers of academia. One of the few papers from our corpus which discusses social justice in connection to the more 'conventional' social justice-philosophers such as John Rawls and Emanuel Kant is (McMenemy, 2021). The paper is published within the library and information ethics, (which we were not sure in which stream this paper belonged) and goes into depth on the concept of communitarianism, liberalism and neutrality which are central concepts in many older academic social justice literature (John, 1971; Jost and Kay, 2010; Miller, 1999).

This fourth and final stream of social justice literature in HCI, engages in a plethora of computer science and engineering research. Like the other streams, this fourth stream is both growing in publications and engagement. A majority of the literature in this stream attends to teachers and students who are to become computer scientists. We note this as an important focus point in how this facilitates long-term commitment of social justice toward future scholars.

5 TIMELINE AND DISCUSSION

In this paper we have introduced how social justice has grown in HCI over the last 15 years, to provide a cohesive, yet fluid understanding of how the concept is shaped and understood in HCI. Through a literature corpus consisting of 60 social justice papers, and the identification of 4 current domain streams of social justice research, we have presented an overview of how the field is progressing forward. Motivated by the methodological approach taken by DiSalvo et al. (2010) to 'map out' where our

field of research is going, we have centered our research aim along their formulation to 'map out the approaches being taken and the intellectual commitments that underlie the area, to allow for community discussion about where the field should go'. We also build on the recently published paper by (Chordia et al., 2024) who attains to a systematic literature review on social justice as an umbrella term aligned with parallel concepts such as transformative, reproductive and disability- justice. As we provide a narrower scoping analysis of social justice literature in HCI we see great opportunity for both papers to be used as foundation for community discussion and development. Before we move to discuss each stream and come back to our guiding questions of analysis, we present and discuss a timeline of each stream for easier access and overview of the corpus. We then proceed to summarize our insights from each stream and finally suggest six considerations based on our guiding research questions.

5.1 Timeline

To show how the streams have evolved through the years starting in 2009 when the first paper from our corpus was published until 2024, we created a diagram which presents the number of stream publications each year (See image 1.). The initial year visually represented through this diagram is 2009, in which our corpus begins. However, it is not until about 2016 that a steady stream of publications in all streams started. Through this diagram we can also note how the first stream of social justice-oriented design, with 17/60 papers, follows along most of the years starting with the first ever title social justice publication in 2009. Design have been a growing social justice domain as shown through our corpus although in the later years it seems that design has slowly taken halt. We argue that the halt in social justice HCI design papers is probably not because of a lack of interest but because many design researchers have begun taking on a larger scope of social justice in which we have then sorted the papers in stream 2. The second stream including research which use social justice as a concept to address large scale social challenges starts in 2017, grows in 2019 and continues until 2024 making up for 17/60 papers. This growth highlights how HCI research has in recent years started to show interest in larger nuances of critical thinking and socio-political change. The third stream of technical communication for social justice is also a growing stream with publications in most years from 2014 also being one of the biggest streams in our corpus with 16/60 papers. The fourth and final stream represents literature from our corpus which interlinks HCI, computer science and engineering mostly attending to teaching and pedagogy. As this streams gradually grows with the most publications in 2024, we suspect more research is to come with the high rise in interest of artificial intelligence and its social effects.

5.2 Moving with the streams(s)

From this point, we bring in insights from all the four streams to provide a conclusive discussion on how to use this paper moving forward. As we set out to write this paper with the purpose of providing a cohesive, yet fluid understanding of how social justice is currently shaped and understood throughout HCI we furthermore come back to our guiding research questions. In doing so, we suggest six considerations for researchers wanting to work with social justice which we hope can gather the community toward a more coherent and reflective usage of the concept.

In the first stream of social justice-oriented design-research we found that much work builds on the paper by Dombrowski et al., (2016) and extends their idea of social justice as an orientation and a horizon. In doing this, many authors build new ideas on

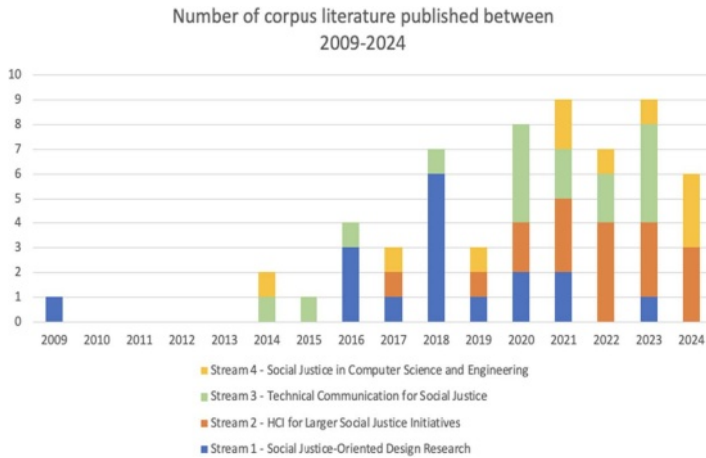


Image 1. Diagram over corpus literature published between 2009–2024

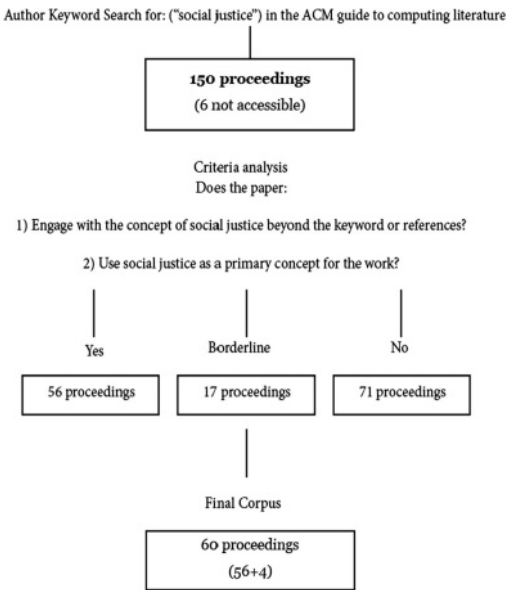


Figure 1. Overview of the selection process

already existing parameters making it easier for future research to follow and to further a cohesion of social justice usage. Besides building on Dombrowski et al. (2016), we see how many authors bring in for example theories on feminism, intersectionality, and design justice which can also act as an adequate way of framing social justice (Kannabiran et al., 2018; Tham, 2019; Tseng et al., 2020; Pendse et al., 2021). We note how these critical theories are more commonly foregrounded in HCI rather than in other social justice literature such as the work by David Miller and John Rawls. There is no one particular topic that is addressed in the design stream and instead much literature touches on a variety of connected areas such as UX and interaction design in correlation with important critical analysis of equity, participation, stigma and marginalization (Acharya, 2018; Corbett and Loukissas, 2019; Tseng et al., 2020; Pendse et al., 2021). We also note how shorter

formats such as abstracts, workshops, short papers and keynotes is a commonly used format used for broader discussions.

In our second stream of HCI literature in which directly addresses large complex social challenges we found an array of fields interlinking the socio-technical with the socio-political. Papers within this stream often make the effort to concretely explain and present the complexity of challenges such as gendered violence, ageism, and disenfranchised communities (Strohmayer et al., 2017; Klassen, 2023; Öhlund, 2023). We argue that in this stream we most easily find and connect contributions to long-term engagement of social justice. In discussing democratic rights and problematizing how sociotechnical solutions are not viable as the end goal of research, literature from the second stream most often realize how nuances of history, culture and society effect participants and outcomes. Moreover authors often highlight how contributions can be used and shaped toward a more equitable future (Johnson and Crivellaro, 2021; Kariotis & Mir, 2020; Strohmayer et al., 2017).

The third stream centers the field of technical (professional) communication and show how the area in much likeness to design, have opened up for a larger theoretical underpinning and more publications in a phase of development as seen in (Ganguly, 2021; Jones, 2023; Jones, 2021; Ojedele-Adejumo, 2023a, 2023b). Many scholars build on the book by Walton et al. (2019) in discussing social justice through the concept of 4R's (recognize, reveal, reject, replace). There has also been some community critique in seeking to better strengthen the framework for future usage (Ganguly, 2021; Jones, 2021; Ojedele-Adejumo, 2023b, 2023a). Despite not always using social justice in a coherent way, sometimes describing it as methods, issues, goals, frameworks, etc. implications or takeaways are often directed at either TPC researchers or TPC teachers, two concrete groups (Flanagan, 2020; Stevens, 2022; Tang, 2020). Overall, we see the development of theory, community critique and increasing rate of publication of social justice literature in TPC as highly positive and hope that the movement toward a larger scope of social justice continues.

Our fourth and final stream attends to literature of computer science and engineering. Here, most of the literature focuses on how computer science education can and should be shaped with a larger attention to justice and equity. In contexts of after-school programs, critical reflections of social implications, anti-oppressive approaches to teaching, critical CS education is

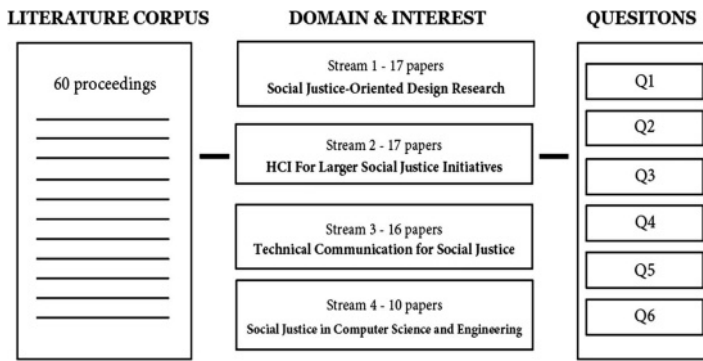


Figure 2. Process of corpus analysis

growing (Van Wart et al., 2014; Ferreira and Vardi, 2021; Lin, 2022; Mayhew and Patitsas, 2023; Fonteles et al., 2024; Padiyath et al., 2024). We welcome a higher sense of critical urgency in CS education considering the exponential growth of artificial intelligence and its power in society. It is also noticeable in this stream how social justice is rarely articulated or defined in a coherent way however through theories like the capability framework by Nussbaum (Zhu et al., 2024) and Frasers three-dimensional justice framework (Jiménez et al., 2019) readers are guided theoretically.

Based on our 4 domain streams of social justice HCI research and our above insights, we move to contextualize and provide initial answers to our guiding research questions.

5.3 Social justice considerations for a coherent future

Coming back to our guiding research questions: (1) How does the paper position and define social justice? (2) Is there a particular type of social injustice? (3) In what ways is the paper engaging in critical perspectives of structural injustice? (4) Is social justice used as a definitive goal or a way of analysis? (5) Who is supposed to act against the framed social injustice? and (6) Are the contributions of the paper aligned with social justice long-term engagement? We have some initial answers. To answer the first question on how the literature within our corpus and throughout each stream defines and positions social justice the most truthful answer would be—in many different ways. Through frameworks, (Ganguly, 2021; Flanagan, 2020; Kariotis & Mir, 2020; Zhu et al., 2024), orientations (Dombrowski et al., 2016; Pendse et al., 2021; Prost et al., 2018; Samuels et al., 2018), adjacent critical theories (Chen & Bergholm, 2020; Jones, 2023; de Castro Leal et al., 2021; Prost et al., 2018; Strohmayer et al., 2017; Tham, 2019), and issues (Jiménez et al., 2019; Tang, 2020; Stevens, 2022) we note the big difference in usage and the lack of cohesion. As we work for a common understanding of social justice attending to reflexivity and fluidity, we do not see the need for only one way of discussing social justice, however, we do wish to make future authors reflect on the following: *Consider articulating how and what social justice means for your particular research context.* By doing this we argue that social justice can become a more accessible concept for researchers to build on and in the end further long-term engagement through cohesion.

The second question, (RQ 2. *Is there a particular type of social injustice?*) is similarly to the first one, not easily answered with a single word. However, if we look at the particular streams, we can note how in stream 1,2 and 3, there is a higher level of

including groups which have experienced marginalization, such as black and people of color, sex-workers, older adults, women and children at risk of violence and abuse, and transgender individuals (Edenfield et al., 2021; Jones, 2021; Klassen, 2023; Lan Fang, 2022; Mudliar, 2020; Öhlund, 2023; Strohmayer et al., 2017). In the fourth stream of corpus literature which includes the CS and Engineering fields, most of the context deals with educational approaches to CS and social justice analyzing how the CS field are in need of more socially critical discussions (Van Wart et al., 2014; Jiménez et al., 2019; Ferreira and Vardi, 2021; Fonteles et al., 2024). From our second guiding research question we suggest authors to: *Consider whom are at the end of the social injustice you are attending to in your research.* As we have already noted through our streams, this is not uncommon in HCI but on the other hand a positive commonality in which we hope will continue in the research community to a bigger degree.

Our third guiding research question asks in what way each paper claiming to work with social justice actually engages in larger questions of structural critical analysis (RQ 3. *In what ways is the paper engaging in critical perspectives of structural injustice?*). Much of the literature in our corpus often foreground a plethora of intersectional directions instead of the more common status quo justice literature by for example John Rawls and David Miller as suggested by (Jost and Kay, 2010). We are convinced that when engaging in theories of a broader scope of inclusion, through for example, Kimberlé Crenshaws ideas of intersectionality (Tham, 2019), Iris Marion Youngs notion on systemic oppression (Chen & Bergholm, 2020; Jones, 2023; Tacheva et al., 2022), the extended thoughts on feminism in HCI by Shaowen Bardzell (de Castro Leal et al., 2021) or the multi-dimensional justice framework by Fraser (Jiménez et al., 2019; Strohmayer et al., 2019) authors are actively working to shape the field for better inclusion of critical analysis. We note how critical positioning is important as to limit using social justice as a signpost for virtue signaling and suggest authors to: *Consider what theory or framework you are using to position social justice as a large socio-critical concept.* By framing this consideration, we hope to make authors aware of the often-sociopolitical nature of social (in)justice and how this can run in tension with for example suggestions of heightened consumption and production.

As we extend the arguments by (Bellini et al., 2022) in questioning non-explicit commitments to social justice and the risk to 'run in tension with or counter the goals for co-liberation, equity and redistribution' we used the fourth guiding research question (RQ 4. *Is social justice used as a definitive goal or a way of analysis?*) to openly look for authors considering social justice as

the end goal of research. While this may not be directly negative, we caution authors framing their socio-technical interventions as socio-political solutions. Many of the social challenges and issues which are explored in social justice HCI research such as racism, sexism, ageism and homophobia are too big and complex to 'solve'. Claiming that certain technological interventions (on their own) might entail a large-scale social change should be carefully considered by researchers as solutionist rhetoric. Social justice is a broad concept, and an area utilized in many ways, however, by reproducing the notion of technology as the key to socio-political change, researchers are actively going against many tenets of social justice as for example anti-capitalistic. Social justice HCI has the potential to frame large-scale socio-political challenges; however, we should tread lightly when implying capitalistic production of digital artifacts as solutions. We suggest that authors: *Consider how you position the end goal of your research, are you implying heightened consumption and production of products?* Despite our arguments of careful considerations toward solutionist framings, we note how much of our corpus literature applies social justice in a reflexive and constructive way, often building on earlier HCI research. This is especially the case for design where social justice has been developed vicariously to better suit the domain and its various approaches, most know through the paper by (Dombrowski et al., 2016).

Our fifth guiding research question (RQ.5 *Who is supposed to act against the framed social injustice?*) asks who is supposed to take action against and change current challenges and issues. When discussing for example democratic change (Johnson and Crivellaro, 2021; Kariotis & Mir, 2020), educational change (K. Flanagan, 2020; Lin, 2022; Mayhew and Patitsas, 2023), or community change (Corbett and Loukissas, 2019; Bellini et al., 2022; Chordia, 2022), who is thought to make the effort? This is an important part of social justice work in order to prevent suggestions of interpersonal change where individuals are supposed to adapt and change their lives when seeking better futures instead of focusing efforts on the bigger context which is inevitably what causes injustice. We therefore suggest the following: *Consider clearly articulating who is supposed to use, buy, learn, adapt, and in the end change to each research outcome in order to prevent misaligned responsibility which can elicit injustice.* We argue that this consideration can better assist researchers to reflect on where responsibility and power of change lies.

Our last and final guiding research question (RQ.6 *Are the contributions of the paper aligned with social justice long-term engagement?*) calls for long-term commitment which is inevitably an important part of social justice HCI research which is also noted through our corpus (Antle et al., 2009; Bellini et al., 2022; Chordia, 2022; Fox et al., 2016; Oden Choi et al., 2020; Öhlund, 2023; Tseng et al., 2020). Such large social challenges framed in much of our corpus cannot be addressed only through small research efforts and instead demands long-standing attention throughout many years and initiatives. To highlight the importance of framing social justice research for long-term commitment, we finally suggest that authors: *Considers how your work can be continuously built on in order to frame long-term commitment to social justice.* We recognize the difficulty of this since many research areas shift throughout the years because of trends in academia. However, if we continue to shape research contributions to foreground more accessible continuation, we build stronger foundations for long-term engagement in social justice HCI.

Moving forward, we ask: *how can our overview and the identified streams serve as a useful tool for the research community?* Firstly, we mean that our streams pose as an initial insight into where social

justice has grown in HCI and in which direction its moving. We argue that it is too early to make any definitive statements on where social justice should or could move, however, we hope that our paper can foreground more accessible community discussions and future research. Moreover, we suggest that our paper does not only provide an overview but has the potential to work as a 'heatmap' of the field showing where the most and least research is conducted. An understanding of this distribution can help to identify research gaps, emerging strands or topics, or where mainstream research in this area has been and is being conducted. We can for example, already note how the design domain is seemingly one of the largest area where social justice is established and developed as opposed to the Computer science and engineering domain where research is limited and still growing. This is helpful in the planning of further studies, and it provides a map where we as a research community can start to fill out the blank spots. Another opportunity is related to an increase in our ability as a research community to critically examine new research in this area. To which domain is research a contribution? What do we already know? How does a new study challenge what we thought we knew? In short, strengthening the collective research discourse and long-term engagement. Here, we suggest that this can be done through the following six considerations:

- *Consider articulating how and what social justice means for your particular research context.*
- *Consider whom are at the end of the social injustice you are attending to in your research.*
- *Consider what theory or framework you are using to position social justice as a large socially critical concept*
- *Consider how you position the end goal of your research, are you implying heightened consumption and production of products?*
- *Considers how your work can be continuously built on in order to frame long-term commitment to social justice*

Finally, most research areas develop slowly, over time. Accordingly, a systematic approach to social justice research need to account for this slow-paced temporality and apply a long-term research agenda. This foregrounds us to understand how society, as well as research in HCI, is slowly changing, moving, reproducing—over time, and how to critically study and center societal impact. Social justice in itself is also complex, and to bring about change in this area is a path panned with challenges. So again, there is no easy way forward, no quick fixes, ready-made solutions or short cuts. It will take time, and accordingly it needs a long-term commitment. While an overview can be thought of as a tool to identify research gaps and enable us to quickly move from one study to the next, our perspective is quite different. We think that societal impact in this area might not be just about projects, small-scale interventions, or made possible through various design experimentations being conducted, but rather that real change happens on an aggregated systemic level. That is, through how individual and small steps taken, together, collectively, steadily, and continuously help us to move forward together—and toward a more just future—for all.

6 CONCLUSION

As justice-oriented research has grown in HCI, we have in this paper presented a scoping overview of four current domain and topical streams of social justice research. We started off by introducing social justice and its growth in HCI during the last 15 years as well as outlining theoretical tenets. Based on 60 articles

collected from the ACM digital library—Guide to Computing Literature, we constructed a corpus of literature building on social justice as one of the main concepts. Describing these interconnected streams gave us the possibility to frame and discuss the current movement of social justice in HCI highlighting community discussion and long-term engagement. We moreover suggested 6 considerations for HCI researchers to reflect on when working with social justice as a concept. By doing this we aimed at providing a cohesive, yet fluid understanding of how social justice is shaped and understood throughout HCI. Through our work and this study, we contribute to the ongoing growth of social justice research in HCI and finally emphasize the need for long-term engagements. This is necessary not only for social justice as a research topic in HCI, but as an approach to strive for and enable societal change in the world—for all .

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Data availability

The data underlying this article are available in the article and in its online supplementary material.

Conflicts of interest

There are no conflicts of interest to declare.

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"The Safest Woman Alive"

A Reflection on Interpersonal Safety Technologies for Gendered Violence Protection

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“The Safest Woman Alive”

A Reflection on Interpersonal Safety Technologies for Gendered Violence Protection

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Abstract

We tell a story of a woman getting ready to go for a walk, using a plethora of personal safety technologies designed and reported on by HCI researchers to ensure her own safety against public gendered violence (GV). To reflect on this approach, we elicit the Four Domains of Power, highlighting HCI’s over-engagement with interpersonal safety technologies when seeking to intervene in GV. In later parts of the paper, we discuss two main contributions for HCI: (1) The Complexities of Designing for GV as an Interpersonal Problem and (2) Complexities of Designing for Normative Understandings of GV to highlight the potential harm in employing interpersonal technological solutions to socio-political issues. Coming back to the four domains of power, we ultimately argue that HCI-researchers and designers can use the framework to analyze their technological interventions to address GV in more nuanced ways as to not re-produce shortsighted, solutionist, or victim-blaming technologies.

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1 “The safest woman alive”: A Prologue

You are going for a walk outside. Maybe it’s dark, maybe not. Maybe you want to take a walk in the city, forest or through your University Campus? To do so, you have been told, over and over again, that you need to protect yourself from the lurking harm out there. The worst imaginable: catcalls, assault, abuse or even rape. To protect yourself you have invested money and time in a wide range of gadgets suggested to you through various research and other projects.

You open your closet to start getting dressed and begin with putting on underwear, attaching a body sensor to your bra [1]. With a plethora of features the sensor can protect you by calling five close contacts on your phone and recording a potential situation. The sensor can also recognize if you are forcefully disrobed and sound an alarm before spraying an “anti-libido” fluid onto the perpetrator.

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Second, you put on trousers and the “smart girl security system” belt. By the touch of a button, the belt sends a silent alarm of your current location to three of your closest contacts as well as the nearest police station. Alongside the silent calls, it also sends out a screaming “siren”, warning others around you while omitting an electric shock to the potential attacker [2].

After putting on your underwear, trousers and shirt, you clip the smart foot device onto your shoes. If you end up in a dangerous situation, you can activate the foot device by tapping one foot behind the other. By doing so, four chosen contacts will be alerted about your whereabouts [3].

Being fully clothed, you now turn to accessories: The first wristband or “Safeband” in your collection contains a button which, similarly to your belt, sends out coordinates to nearest police station and close phone contacts if pressed. At the same time, a light on your wristband switches on as soon as police are dispatched – if forcefully removed by your attacker, police is contacted once again [4]. You put the “safety system watch” onto your second arm and place the “neck chain pendant” [5] onto your necklace. When in danger, you know you can tap the pendant three times to send out your GPS-location to your close contacts while turning on a video which is sent to “police control centers” - you’re not entirely sure what this means or exactly where your data is being sent, stored, and what it’s then used for. By calling out a “wake-up-word” of choice the linked watch emits a buzzer noise to ward off the potential predator. You know that if the alarm alone doesn’t fend off the attacker, the watch doubles as a tazer, shocking anyone trying to touch you [5]. For additional measure, you add your third “smart bracelet” onto one of your wrists – this one automatically senses, detects and identifies physical abuse. If it detects assault, the bracelet triggers your phone to call the emergency services while sending your location to them [6]. You now have three wrist bands on your arms, but as you don’t want to take any chances, you keep adding the safety technologies to your body. The fourth wristband is the “wearable women safety device” which monitors your body parameters such as heart rate and temperature – the bracelet sends this information on to law enforcement and your family along with your location if you activate the system through the touch of a button [7]. You put on your fifth and last wristband from your security closet which through the touch of a button determines your location, sends an alarm message and your location to your close contacts, and your body temperature and heart rate to the nearest police station [8]. Your final accessory is the “Smarisa” ring, which sends the location of any potential attack to your close contacts while filming the attacker [9]. Finally, you put the “women security system” into your handbag: a pepper spray and GPS-location stick with a secret camera that can film any attack [10].

The last thing you do before you leave the house is to double-check if the security apps you've downloaded onto your smartphone are working. You start by checking the first app called "Safe street" which registers street harassment in real-time and gives you suggestions for safer routes [11]. Then you turn on your second app, which can suggest safe routes and show you which routes are most unsafe at that time when traveling out in public. You also have a panic button in this app which sends a message to your trusted circle and starts an audio recording of any abuse for evidential purposes [12]. Your third app can also send an SOS message to your close friends and contacts while also sensing if someone in your surroundings is carrying a hidden camera and recording audio and video of a potential situation [13]. The fourth app contains lots of valuable information in case of various attacks such as the location of hospitals and police stations and counselling. It can also monitor your health to the point where it sends you a notification if you need to go to the doctor so to prevent unwanted pregnancies after an instance of rape. Moreover, during an attack, by pressing the volume button on your phone, the app sends three calls and texts to chosen contacts and the nearest police station [14]. The fifth app called SafeRoute can in real-time suggest the safest route for you when walking or biking [15]. The sixth app is activated by the push of a button where it sends your current location to close contacts every five minutes. By doing this your location is updated if you were moved around during an attack [16].

If you find yourself in need of a police station or women facility locator, you can find this in your eighth app which also offers an emergency button and the potential to be accompanied home by a "scouter" [17]. You have three more apps that also allow you to document your experiences of harassment to warn others or to collect as evidence for a court case: Harassmap [18], Hollaback! [19] and Prohibitadi [20]. On all three app-websites, you can see a map of where previous incidents have happened.

2 Paper overview

In this paper we do two key things: (1) we reflect on and contextualise how many safety technology interventions in HCI seem to be designed for potential victim-survivors who are encouraged to change their behaviours and activities in public, and (2) generate conceptual language for how we can shift our attention in HCI to addressing the underlying cause of the violence: perpetrators, potential perpetrators and the underlying structural issues of GV. This work sits alongside a growing body of critical research on violence and safety, as well as unsafety, in our post-digital world – where we understand that our physical and digital lives are deeply intertwined [21], [22], [23], [24], [25]. As HCI moves to tackle and intervene in complex socio-political challenges of GV, we seek to direct attention to two complexities which we argue is often overlooked when designing for interpersonal GV prevention: (1) The Complexities of Designing for GV as an Interpersonal Problem and (2) Complexities of designing for normative understandings of GV.

We use this alt-chi format as a platform to open up discussions on moving away from misaligned, shortsighted, techno-solutionist and victim-survivor-changing ideas that may be re-produced when suggesting more technologies for women and gender non-conforming individuals to protect themselves from GV. By doing this, we add

to the growing body of work in HCI which demands socio-political and systematic change, not interpersonal technological interventions [22], [23], [24], [26], [27], [28], [29], [30], [31]. We believe the design of digital technologies can contribute to all aspects of this in creative and meaningful ways along a spectrum of designing technologies without advocating for technological solutionism.

3 Designing for Gendered Violence Prevention

Gendered violence (GV), such as sexual harassment, rape, forced marriage, female genital mutilation, physical, economical and psychological violence, are unfortunately experienced by a third of women globally [32]. In this paper we use the term *gendered violence* instead of violence against women and girls (VAWG). While these terms are often used interchangeably, we use gendered violence so as to be inclusive beyond the usually heteronormative discussions in VAWG literatures and support services, including queer women and gender-nonconforming individuals [33]. GV expresses itself through many levels in society and not only through interpersonal interactions: e.g. Anti-LGBT+ rhetoric, abortion bans, and the seeming inability for police forces and governments to prosecute rapists at scale, show some of the breadth and different kinds of violence that can be experienced beyond every-day interactions [34], [35], [36].

It is important to highlight, that even relatively 'small' aspects of GV (e.g. Microaggressions) feed into this wider ecosystem of harm, abuse, and violence (e.g. Systemic injustices and laws that result in refusal of healthcare of women due to their pregnancies) [37]. Issues of GV are closely linked to issues of white hetero patriarchy, meaning that people who don't conform to traditional gender expression, people of colour, those who are disabled or neurodiverse, or have additional support needs are more at risk of violence [21], [38], [39]. Furthermore, depending on stereotypes associated with certain behaviours, victims of violence can be seen as 'bad' victims by formal actors in criminal systems (eg. Police, courts, etc.) as well as in less formalised systems of post-traumatic support (eg. Support services, counsellors, etc.) [35]: for example, it is not rare that a woman's choice in clothing is cited in criminal rape proceedings [40] or that sex workers' harm and/or violence are unfairly dismissed as a 'risk' of their work [41].

On top of this, taboo and prejudice surrounding GV often create complex situations and feelings of shame for many people experiencing harm and abuse, as well as those seeking justice [42], [43]. This shame can also be fueled by stigma surrounding experiences of witness and victim-blaming rhetoric which shifts guilt and blame towards victim-survivors and away from abusers [43]. The deeply entrenched issues of GV are complex and despite both structural and interpersonal preventative actions taken by governments, aid organizations, activists, and researchers around the world, many people continue to face violence every day. HCI researchers are of course also part of this ongoing global work to eliminate GV and abuse. As highlighted in our opening story, a lot of research related to physical safety in HCI centers street harassment or other forms of violence perpetrated by strangers in public spaces. This kind of violence is hyper-visible making it relatively 'easy' to target for HCI researchers as a straightforward problem to 'solve'. Interpersonal violence from strangers on the street is something we

can see a relatively simple solution to by suggesting that if women protect themselves with technological gadgets, they will be able to stop an attack. However, that is not how the majority of violence perpetrated against women and other gender non-conforming individuals takes place [25], [44], [45], [46]. While street harassment is a major concern for many around the world, the reality of violence perpetrated against women and gender non-conforming individuals is often more hidden and complex as the most common form of GV occurs from intimate partners [47] and is perpetrated by people close to victim-survivors [48], [49].

Despite the good intentions behind the technologies centered through our prologue, we add to the arguments of feminist researchers, especially those who focus on topics of violence [27], [39], [50], [51], [52] that we must move beyond designing almost exclusively personal safety devices for potential victims of what seem to be random acts of violence from strangers. Interpersonal violence is part of wider systems of harm, oppression, and violence [50], [52]: experiences of harm are part of patriarchy. Using this terminology immediately places us in a feminist frame, which we use unapologetically in this paper – as many other researchers have done in HCI in recent years [27], [53], [54], [55], [56]. Looking towards feminist framework would give us space to explore wider causes and would also use HCI and design research to understand, address, and explore the underlying root causes, tackling harms where they come from rather than where they are experienced. This includes designing for the people enacting the harm [57].

Like others, we argue that we should discuss the complexities of socio-political structures that uphold GV, and how HCI research (processes and outcomes) can support structural change and interpersonal behaviors that could genuinely reduce experiences of violence. In recent years, HCI researchers have started to engage with wider theories of violence that is perpetrated through white hetero-patriarchy and has begun to unpick the structural issues associated with GV and harm [21], [24], [58], [59]. Often, this work is critical of quick fixes but may still present tangible implications for the design of future technologies. In this frame, we build on this existing critical research related to GV and elicit Patricia Hill Collins' four domains of power as a useful framework for exploring the roles HCI can play when addressing such topics

3.1 The Four Domains of Power

The matrix of domination and four domains of power were originally articulated by Patricia Hill Collins in her book *Black Feminist Thought* [60]. Initially it was shaped to address the complex marginalization and discrimination against black women in the U.S. but has since been used by many others to explore intersecting experiences of harm and violence [56], [61], [62], [63], [64]. The four domains of power are a framework describing different social levels of oppression and how it is managed through, for example state laws, bureaucracy, cultural norms or everyday interactions. The four domains relate to experiences of (1) structural, (2) disciplinary, (3) hegemonic, (4) interpersonal harm and/or oppression. We adopt this framework to discuss how interpersonal safety technologies designed to stop GV often falls short in addressing higher levels of power-domains. We discuss the four domains of power for two main purposes (1) to highlight how GV and patriarchal oppression

takes different forms and is organized on different levels in society and (2) to highlight how the examples we position as part of our prologue primarily fall into the interpersonal domain; building our argument for the need to expand HCI research about digital technologies and reduction of GV into the three other domains of power.

The most abstract, largest and static domain is called the **structural domain**. This entails how oppression (in our case GV) is organized through large scale social institutions such as the educational and legal system and through economic imbalance. As a result of patriarchal oppression through the structural domain, we note there is less funding and opportunities for girls and women to go to school [65], and structural inequalities related to funding for women shelters and aid-organizations [66], as well as women's health initiatives [67] – of course these systematic issues are compounded by additional axes of marginalization such as race, ethnicity, disability, neurodiversity, immigration status, and so on [39], [56], [63]. Moreover, we note how many laws and regulations regarding women's safety are not sufficient for their protection from GV and patriarchal oppression [68]; which we must also directly link to ongoing undermining of women's safety in large western economies. Furthermore, there are even fewer structural protections for trans, queer, and other gender-nonconforming people [69], [70] (or there are active movements to undermine and reduce the protections queer people have fought to have), who must also be included when discussing GV.

The second **disciplinary domain** includes organizational practices and bureaucracy. This disciplinary domain relates to patriarchal oppression through regulations and control. Examples of these practices include the difficulty for many women to press charges against attackers or abusers through a complex and often stigmatizing justice system [34] - as we highlighted above this would also include the hierarchies of victimhood [71] making it ever more difficult for those who are deemed 'less deserving' of justice to argue their case. It also includes the common trivialization of reports on sexual assault and the often victim-blaming processes of testimony [34], [72]. For example in the UK only 1.3% of rape cases documented by police result in a suspect being charged [73]; this inevitably leads to many victim-survivors not seeking legal justice routes.

The third **hegemonic domain** legitimizes patriarchal oppression through the reproduction of harmful norms, cultures and ideologies. Between different countries and cultures women are perceived very different. In more conservative cultures women can be perceived as 'belonging to men' and be responsible for their honor which is then often cemented through laws and the media in such countries [74], [75]. These cultural understandings are of course not universal but are felt differently across cultures and countries. However, the hegemonic domain manages oppression even in the most liberal countries where conservatism might not be as visible but where women are still often shamed for their sexuality [76], [77].

The last and most visible domain is the **interpersonal domain**. For this domain we note individuals direct lived experience and day to day interactions of, for example, physical and psychological GV such as is [15], [17], [48], [59], [78]. These practices also include public sexual harassment and abuse by strangers as well

<p>STRUCTURAL</p> <p>Organizes oppression through large-scale social institutions (macro-level)</p>	<p>DISCIPLINARY</p> <p>Manages oppression through practices and bureaucratic rules</p>	<p>STRUCTURAL</p> <p>Less funding for girls education and opportunities for attending school Little support for shelter and aid organizations Little funding for womens health Laws undermining girls and womens rights</p>	<p>DISCIPLINARY</p> <p>Upholding complex legal structures causing difficulties in reporting abuse The trivialization of women and girls' stories of abuse and assault through</p>
<p>HEGEMONIC</p> <p>Involves ideological and cultural norms. Shapes beliefs, norms and ideas</p>	<p>INTERPERSONAL</p> <p>Everyday interactions and experiences of oppression through personal relationships (micro-level)</p>	<p>HEGEMONIC</p> <p>Upholding and reproducing victim-blaming ideas through media Upholding and reproducing stigma and taboo ideas on female sexuality</p>	<p>INTERPERSONAL</p> <p>Direct IPV Public sexual assault and harassment Female genital mutilation Stalking</p>

Figure 1: The four domains of power a) original model b) examples contextualize towards gendered violence

as direct intimate partner violence which might be considered personal issues but is however highly rooted in the other domains of power rendering GV [60]. Since this domain is highly visible and concrete in its form (in most cases because it is what people can see with their own eyes) the way to counteract interpersonal violence can happen through interpersonal safety technologies in which we report about in the prologue of this paper.

In discussing design for GV prevention and bringing in the four domains of power to contextualize different social levels organizing GV we now move to further examine complexities arising when treating GV as an interpersonal problem and a normative understanding.

3.2 Complexities of Designing for Gendered Violence as an Interpersonal Problem

Despite the many opportunities arising from HCI researchers positioning technology and design as a means of reducing GV and tools for systemic change, many contributions of anti-violence technologies particularly suggest women to change their behaviors and actions in public, which we highlight in our prologue story (See e.g [3], [4], [5], [9], [11], [14], [16]). While interpersonal safety technologies are definitely an important part of widespread violence prevention, we highlight how an exaggerated attention to individual change can foreground misplaced trust in technology and elicit further harm and stigma to those we are trying to help. For example, Sultana and colleagues, (2018) initially went into their field site with the intention of spending time together with women from rural Bangladesh to guide them towards ideas of technologies which could improve their lives. However, the research team quickly realised that the sheer weight of the socio-political issues faced by their participants was “*beyond the scope of design interventions of the scale and forms we are used to in HCI.*” We extend the insights from Sultana et al (2018) towards violence-prevention technologies foregrounding how socio-technical interventions need to address the many complex nuances of GV while also demanding a larger attention to socio-political and cultural structures. To contextualize our arguments, we give examples of safety technologies which are thought to help women protect themselves from interpersonal GV,

such as smartphone applications that claim to lead women along ‘safe’ routes and gadgets that send information about attacks to emergency services and close family members.

In suggesting a GPS-based smartphone application where women choose their route to work depending on where reports of street harassments have been made, we recognize the intention to “*facilitate women to feel secured to boost self-esteem and participate in daily-life activities*” [11]. Similarly, in proposing security systems for women faced with critical issues that track and send locations [5], [7], [14], [15], [16], sound alarms [1], [5] and omit electric shocks [2], we also understand and support the intention of wanting to: “*solve the (critical) issues [faced by women] with technologically sound equipment’s and ideas*” [2]. However, we must consider the wider impacts of these kinds of suggestions. In cases of safety technologies which suggest alternate routes for women, we draw on research that highlights that the ‘safety’ of routes is influenced by peoples’ intersecting identities [79], [80], [81], and when such types of routing systems were for example, rolled out via Microsoft, they garnered backlash from many, including the American Civil Liberties Union [82], [83]. Such ideas lead us to asking questions related to which routes are ‘safe for whom’? We also want to question the implicit notion that women should avoid certain locations to protect themselves – arguably limiting their movement and reducing the space they are allowed to take up in the world.

While many safety gadgets carry features for women to fight back in situations of violence, we argue that a broader analysis of *why* women need to be handed for example apps for location tracking, siren alarms, panic buttons and electric chocks would benefit the HCI research community – and whether they are in line with contemporary discourse related to feminist safety and security research [17], [56], [79] as well as trauma-informed, harm-reduction and violence-prevention HCI research [24], [59], [78][84]. Importantly, this should intersect with developments in intersectional and specific-community needs, such as the inclusion of neurodiverse [85], gender non-conforming [86], trans [69], and fat [87] bodies in our design processes; including specific design research related to safety concerns of these communities [70]. We also argue that

HCI-researchers need to analyse the implications of suggesting that technological safety artefacts will be “*solving issues faced by women*” [2], “*prevent sexual assault*” [1], or “*ensure the safety to the women*” [4] in deeper, more nuanced ways. There have been instances of socio-technical artefacts that have been used to for example bring in important attention to the width and depth of GV in Egypt through the website Harassmap [18] or to reveal the everyday reality of street harassment for many women in New York through the platform Hollaback (now called Right To Be) [19] we continue to highlight that the complexities width of GV as a large structural issue of systemic nature is too big to solemnly fight with technological devices alone. For example, some of the success of Harassmap has come not only from the collection of data, but also from its use for activists, in courts, and so on. These distinctions are important to make so as to not reproduce techno-solutionist arguments.

With this discussion, we add to existing concerns about solutionist rhetoric in HCI [48], [78] which puts the responsibility of violence protection/prevention on women and gender non-conforming individuals as opposed to social institutions feeding into structures of GV. We also argue that by suggesting women to be the responsible party to prevent interpersonal violence by buying, learning to use, use correctly, and limit their lives to correspond with any safety technology, the burden of addressing GV in wrongfully placed.

3.3 Complexities of Designing for Normative Understandings of Gendered Violence

Technology has the potential to change and assist in many processes, and for other purposes than “solving” systemic oppression and GV we recognize its value in for example providing tools of support for victim-survivors [20], [25], [78] or to design *within* the patriarchy in empowering women without putting them at risk for further vulnerability [59]. In doing this we move away from direct techno-solutionism and misaligned safety responsibilities. When exploring potential design “solutions” and interventions to fight GV, it is not uncommon for HCI researchers to shape their work after normative understandings of interpersonal public-violence scenarios such as verbal harassment and physical assault [1], [3], [5], [6].

To address street harassment in public environments some of the examples in our prologue center technological solutions employed in infrastructure so as to be able to automatically sense GV. Through for example an emergency button installed in company cars notifying the company and nearest police station when a woman feels discomfort or an automatic female-fear and anger emotion recognition device for metro systems initiatives aligns towards the protection of female commuters [88], [89]. While we again recognize the well-intended-meaning and sense of urgency in these cases, it is the social contexts in which these solution sits that becomes problematic: we know that facial recognition systems are not trained on diverse-enough bodies [90], [91] and that emotion-recognition is near-impossible [92], resulting in untrustworthy algorithms that may cause more harm than do good. Furthermore, this kind of technology assumes that visible alarms will trigger others to help and discourage an attacker, which is not

always the reality [93]. Moreover, we argue that any gender non-conforming individuals would probably be hesitant to interact with any such public infrastructure system since increased structural stigma and taboo could mean that attention from the public, police and authorities could lead to even greater violence [69], [70], [94].

Taking all of the above to its logical conclusion, we argue that by designing safety technologies based on specific normative scenarios of GV, we require victim-survivors to correctly analyze any upcoming dangers, take the correct preventative measures so as to activate the corresponding protective features, all while also fitting the normative profile of ‘a woman’. This means that artefacts which are put forward as part of the solution for GV only work if each imagined violence scenario of abuse happens in the intended way, which is highly unlikely. Furthermore, sensor-driven devices must be triggered by specific ‘expected’ and normative responses to potential harms (even if we know that people react differently to forms of violence based on their previous experience – sometimes referred to fight, fight, or freeze reflexes [95], [96]).

When wanting to design interpersonal safety technologies to reduce GV, it is not wrong to think that a top-of-the-line technological gadget should be able to perform all of the safety measures that we highlight in our prologue or in this section. However, we argue that it becomes rather absurd to think that the safety of women and gender non-conforming individuals should depend on (1) using products correctly or (2) ensuring normative gender presentations and reactions. That products are able to predict and ward off every possible situation of GV, IPV and sexual abuse. This means coming back to one of our main arguments in highlighting how no HCI safety technologies can single handedly solve or prevent GV and how the responsibility of doing this should not fall majorly on victim-survivors.

4 Resisting the urge to design: Implications for research

Starting off this paper with our prologue, we introduced a variety of wearable safety technologies and mobile phone apps meant to protect women from GV scenarios. We then discussed some of the complexities and pitfalls of putting the responsibility of GV prevention and protection on victim-survivors as misaligned and over-emphasized. Secondly, we argued for the shortcomings of designing technological safety devices which are thought to prevent any possible outcome of interpersonal GV if only used correctly by victim-survivors and normative bodies. Coming back to the four domains of power to contextualize how different levels of social practices organizes oppression of GV (see section 3.1), we now highlight and build on the framework as a valuable tool for HCI-designers seeking to address GV and the many issues arising from it. We argue that HCI-researchers and designers alike can use these domains to analyse which of the levels they are designing technological interventions for and addressing GV on. We believe, this reflection can assist designers in avoiding misaligned, shortsighted, solutionist or victim-blaming tendencies of digital technologies which we outlined throughout section 3. Using the framework can better crystallize which level of practice the intended technology is situated in.

<p>STRUCTURAL</p> <p>Organizes oppression through large-scale social institutions (macro-level)</p>	<p>DISCIPLINARY</p> <p>Manages oppression through practices and bureaucratic rules</p>	<p>STRUCTURAL</p>	<p>DISCIPLINARY</p> <p>Yoo & Doucine, (2021) Ahmed, et al (2014) Dimond et al., (2012) Grove, (2002)</p>
<p>HEGEMONIC</p> <p>Involves ideological and cultural norms. Shapes beliefs, norms and ideas</p>	<p>INTERPERSONAL</p> <p>Everyday interactions and experiences of oppression through personal relationships (micro-level)</p>	<p>HEGEMONIC</p>	<p>INTERPERSONAL</p> <p>Surosh, et al (2016) Monisha, et al (2016) Lindsay, et al (2013) Hoban, et al (2017) Viswanath, et al (2016) Narva, et al (2018) Gerata, et al (2022) Mahmud, et al (2017) Yarrabothu, et al (2015) Islam, et al (2018) Lokenh, & Gadgi (2017) Levy, et al (2020) Patel & Hasan (2018) Narva et al., (2018) Gopalkrishnan, et al (2022) Chengala, et al (2014) Ali, et al (2015) Jatti, et al (2016)</p>

Figure 2: The publications from our prologue contextualized into the four domains of power

To show how the framework can be used we have added each artefact from the prologue into four domains of power (see image 2). As noticeable in image 2, most artefacts from our prologue are aimed at addressing the interpersonal domain specifically in context of public street harassment. Only four papers which we included in our prologue discuss wider complexities of designing for GV is beyond the specifically designed technology. These papers [17], [18], [19], [20], which do not directly design an artefact and instead report on already existing ones, all discuss how large challenges of systemic nature such as GV demand interventions and attention across all domains and on all levels in society.

The visual documentation of our analysis highlights that there is a disproportionate focus on interpersonal violence in anti-violence technology research in HCI. We do recognize how the structural, administrative and hegemonic domains are harder to design for, understand and address. However, this should not be seen as challenges not fitted for HCI but rather imperative factors to consider and analyze when seeking to address issues of GV. In this analysis, we only include papers that designed or reported on specific wearable and/or digital applications that aim to prevent or protect from violence – we are aware there is much critical research in HCI that discusses GV on a more structural scale. However, this research (which includes some of our own) is often missing practical applications and/or anti-violence intervention.

What we sought to do in this paper is to add to the ongoing discussions of how the many designs available as interventions and solutions to GV for women all around the world often miss opportunities when it comes to substantially addressing structures of patriarchal oppression; something that is inherently difficult, complex, and complicated to do. To help researchers reflect on their design processes as it relates to GV we present four implications together moving forward towards larger framings of GV prevention research in HCI.

4.1 Good Intentions are not enough

We understand that the research examples part of the prologue is all conducted with good intention and a sense of urgency – we do not

contest this. We also recognize that there are different global and local community factors that make the need for certain interventions more urgent than others (eg. [20], [59], [97]). These aspects have not gone un-recognized in HCI and are imperative perspectives to analyse [59], [78]. However, despite the well-meaning intentions behind much of the work which we highlighted in this paper, there is a disproportionate focus on interpersonal change and crisis response. This inevitably means that preventative and other protective approaches that center systemic change through socio-technical artefacts are underrepresented. In turn, this can create an over-justification for techno-solutionist rhetoric and technologies, reducing other potentially less lucrative and ‘innovative’ but more mundanely useful systems.

4.2 Scrutinizing Academic Pitfalls

We would like to extend the discussion around the very structures of our research field and academic career paths. We recognize how a straightforward aesthetically pleasing design that addresses highly visible social issues are probably considered more “attractive” not only to ECR’s who works to make their research visible but also to conferences, journal formats publishers and funders. Having something tangible to show out of research, such as a working gadget, can feel like a more concrete contribution than, suggestions, considerations and reflections of a socio-political nature. In reality though, many of these kinds of ‘solutions’ rarely make it out of our insular world of HCI; arguably, this is not necessarily inherently problematic, but it becomes so when presented as solutions to complicated problems. It is here again, where we want to highlight the need of working in allyship with support services, meaningfully, and explore how our research can function as part of wider prefigurative politics [26] and contribute to ongoing activist efforts [98].

4.3 This problem is bigger than HCI can fix

As we have pointed out throughout the paper, HCI researchers are only one small part of wider work that aims to eradicate GV. In this paper, we are centering the HCI community for a variety

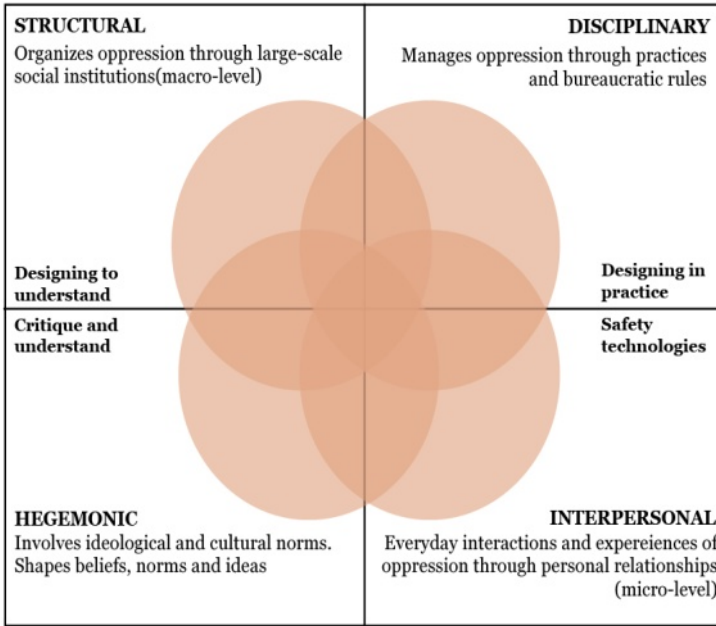


Figure 3: The four domains of power including four circles of potential HCI focus

of reasons: (1) because we are a part of it and (2) to understand that there is work to be done within our own community that can advance understanding of violence prevention and reduction (including work that needs to be done within our own community to reduce violence [99], [100], [101], [102], [103]. But what we are talking about is bigger than HCI – we need to not just address the issue of GV as a digital intervention one, one that is related to research only, or one that only focuses on the very important crisis points. There is some fantastic work that understands research and design in partnership with support services [24], [49], [78], [104], [105], and we need more of this. Importantly though, we do not just need to work ‘in partnership’ but also in allyship, in affective alliances, in networks of care, and in justice-oriented ecologies that tackle violence at its roots, that provide genuine preventative support, and that continue to intervene in crisis situations (albeit with more nuanced understanding of what might actually work in those situations) – moving forward the discussion on and interventions for the reduction of GV. This is not solely a research concern, but one that is global, international, national, and hyperlocal.

4.4 HCI beyond gadgets and critique: developing a framework of safety-HCI research

We argue that there needs to be a larger conversation in the HCI community to imagine more ambitious futures related to GV. We need new imaginaries that support our re-evaluation of our own

position in addressing systemic oppression such as GV. Some researchers have started to ask questions about what a trauma-informed design and/or social media space could look like [84], [106], but we want to go further and ask for alternative forms of harm reduction and violence prevention? What would a design process look like that intervenes in non-carceral ways at early signs of willingness to perpetrate violence? To respond to some of these questions, we present a framework for different trajectories of work that range from technological gadgets that address a very specific anti-violence need (such as the ones we described in our opening story); opportunities for designing in practice – developing tools and resources with and for activists, support organisations [21], [105], [107], [108], [109], [110], and those working to eliminate harm by working with perpetrators; designing to better understand and re-imagine what HCI research might be able to do when we discuss harm reduction approaches related to gendered (and racial) violence; and all the way to the use of HCI research and design processes of digital technologies to critique and understand (see image 3). We believe that HCI and Design research can be useful in the ongoing work to reduce violence across all areas along this trajectory from gadgets to critique – but importantly research must relate to all of these aspects, situated in context of the four domains of power.

5 Conclusions

This paper examines the complexities of designing for interpersonal and seemingly instant responses to longstanding, deeply rooted systemic oppression. To highlight the complexities of designing

for interpersonal GV protection we told a story of a woman getting dressed to go for a walk thinking she needs to wear and use a plethora of technologies to ensure her own safety. We do this to bring attention to what we argue is an over-emphasis on interpersonal violence-prevention and crisis-response produced by HCI researchers. To make our argument, we used the four domains of power as originally articulated by Patricia Hill Collin, to contextualize other equally important social levels that also manages oppression. By discussing HCI papers suggesting and reporting on interpersonal technological artefacts to intervene in GV scenarios, we discussed (1) The Complexities of Designing for GV as an Interpersonal Problem and (2) Complexities of Designing for Normative Understandings of Gendered Violence. We then brought in a discussion on the potential harm in employing interpersonal socio-technical solutions to socio-political issues and come back to the four domains of power as a tool in which we argue that HCI-researchers and designers alike can use to analyse on what level they are designing technological interventions that address GV so as to avoid the simplistic views that lead to technosolutionism that we see too often. Our contribution expands the ongoing critical wave in HCI that closer examines technology as tools of power. While we do not contest designers' intentions nor design, in this paper we frame both the dangers in only addressing potential victim-survivors in a crisis situation and the opportunities of analyzing the larger socio-political structures causing GV. Ultimately, we present a framework that HCI researchers can use as a reflective tool when designing anti-violence and/or harm reduction approaches.

We hope that this framework will be useful for researchers as a reflective tool to explore where their work is situated. With this knowledge, we are then able to explore how our work relates to the other domains of power and ways of doing HCI research. This is of course not a complete tool and should be read in conjunction with specific literatures related to the specific issues the researchers are aiming to combat (eg. safety for LGBT+ people, black women, neurodivergent, and disabled people, etc.). We also want to contextualize this framework with the understanding that it is unlikely that, as society, we are going to end all violence. Here, we take inspiration from To and colleagues [111], who are re-imagining anti-racist technologies through lenses of joy and playfulness in design: What would an alternative imagination for technologies and their design processes look like, if we took ecosystems of harm and violence into consideration and re-imagined our frame of reference?

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