Disaster Risk Reduction for All?

Understanding Intersectionality in Disaster Situations

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Abstract. When designing digital services for citizens in a disaster situation, the diversity of its audience and their particular needs are not always sufficiently taken into account. Variables like digital equipment available, environment, disabilities, socio-economic status, etc., play a significant role in people's ability to access and exchange important information through digital means. In this paper, we will examine some factors that lead to this inequality, and we see that they tend to boil down to a lack of awareness or focus on the diversity of the population, and this affects not only people with disabilities, but also other disadvantaged groups. More broadly, we will examine this in terms of *intersectionality*, and suggest how Universal Design can contribute to mitigate these issues. The issues will be illustrated with example scenarios, using personas for highlighting issues that can affect members of intersectional vulnerable groups in a particularly strong way during a disaster.

Keywords: Universal Design of ICT, Digital Citizen Services, Intersectionality

1 Introduction

2020 has shown the world that disasters can strike hard and wide. Not all disasters come in the form of sudden but short bursts of chaos followed by a clear recovery phase. The COVID-19 pandemic has demonstrated that resilience comes in many forms, and the way society has managed to cope with the situation has required an enormous effort from everybody. For example, most schools and universities have managed to turn around from in-class teaching to remote digital teaching very quickly, and people in many occupations are working efficiently from home with their own digital equipment and network.

However, the success of this swift transformation is not equally distributed. When digital solutions are chosen, the diversity of its audience is not always considered. Returning to the example of schools and universities, students may get very different support depending on many factors, including their own digital competence and the digital competence of the teachers and parents, digital equipment at home, disabilities,

socio-economic status, etc. In this paper, we will examine some factors that lead to this inequality, and they tend to boil down to lack of support for the diversity of the population, not only people with disabilities, but also other disadvantaged groups. More broadly, we will examine this issue in terms of *intersectionality*.

In feminist theory, especially the stem starting from black American feminism, "intersectionality" is used to identify the relation between systems of oppression that compose our identities and collocation in the hierarchies of power and privilege (Carastathis, 2014). In other words, the concept itself is meant to explore the role that race, class, gender, disability and other axes of power play on women's identities and lived experiences (Davis, 2008). Intersectionality's focus on the dynamics of power and discrimination has been paramount in introducing discussions on societal disadvantage in political discussions and academic disciplines that were not including it before, such as geography, organizational studies, computer science and more (Cho, Crenshaw, & McCall, 2013).

In 2006, the United Nations ratified the Convention on the Rights of Persons with Disabilities (CRPD) and, among other things, acknowledged intersectionality as an important element in the experience of people with disabilities. The Preamble, for example, recognized that the relationship between different forms of discrimination included "color, sex, language, religion, political or other opinion, national, ethnic, indigenous or social origin, property, birth, age or other status"(Giannoumis & Stein, 2019). In the context of this article, we will adopt the term "intersectionality" as intended in the CRPD, as an intersection of disadvantages in the face of society.

During the COVID-19 pandemic as well as other disaster situations, access to digital tools and platforms can make a big difference. Being unable to use digital tools in a disaster situation can in the worst case mean the difference between life and death. Being left behind during a period of education can have severe long-term effects including difficulties to find employment, as well as serious psychological and physical problems.

The rest of the paper is organized as follows. In section 2, we analyze the term "intersectionality" from the initial definition of Kimberlé Crenshaw to its more modern meanings. In section 3, we present three scenarios that present different realistic but made-up typical examples of situations that highlight issues related to intersectionality, using persona that are similarly realistic but made-up characters that illustrate the issues we wish to highlight. Following each scenario, we will discuss the scenario and how intersectionality affects the situation and the ability of the actors to use the relevant digital tools to cope with the situation. In section 4, we discuss Universal Design of ICT and how it can mitigate problems not only for people with disabilities, but also other issues caused by intersectionality. In practice, UD sometimes boils down to taking into account people with disabilities and accessibility. Here, we argue that we should embrace a broader scope of Universal Design of technology for disaster resilience. Finally, section 5 contains a brief set of recommendations on how universal design can contribute to mitigating the effects of intersectionality and concluding remarks.

2 Intersectionality

Kimberlé Crenshaw coined the term "intersectionality" in 1989, as the argument within her essay "Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine, Feminist Theory and Antiracist Politics". The purpose of the term was to describe the interaction of multiple oppressions in one human experience, like the one of a Black Woman. The term itself derives from the analogy Crenshaw decided to use to concretize the concept: Discrimination, like traffic through an intersection, may flow in one direction, and it may flow in another. If an accident happens in an intersection, it can be caused by cars traveling from any number of directions and, sometimes, from all of them (Crenshaw, 1989). It is often hard to determine which driver caused the most damage or how much the fact that the victim was hit on multiple sides at the same time weighted in the final prognosis. In the same way, Crenshaw argues that Women with intersectional identities, Black Women in the case of her essay, experience discriminations just like accidents at traffic intersections: the injury could be the result of sex discrimination or race discrimination, or, often enough, a combination of the two.

Before Crenshaw's essay, women's studies and feminist theories focused mainly on the effects of gender and sexism, leaving Black and Latino studies to explore and protest the effects of systematic racism and color discrimination. Both fields were adamant in asserting how complex and layered the sets of inequalities our society is organized around is, and were therefore interrogating historical patterns of power and domination (Dill & Kohlman, 2012).

Between the 1970s and the 1980s women of color and activists from the United States and the United Kingdom started voicing critiques about the simplistic and yet widespread political discourse that considered "all women are white and all men are black", centering once again white people's experiences in the discrimination discourse (Ferree, 2009). Especially coming from the 1950s, the only relevant experience women were supposed to be having according to the mainstreaming discourse was related to the lives of White Women and their struggles as wives, daughters and mothers, and tragically distant from the difficulties and discriminations of Black Women (Dill & Kohlman, 2012).

After Crenshaw's essay, the term started being adopted by the whole Black Feminism Movement. It was instrumental to express the concept of multiple oppressions that Black Women had been referring to since the times of slavery using terms such as "interlocking oppressions," "simultaneous oppressions," "double jeopardy," "triple jeopardy" (Smith, 2013).

At the present day intersectionality has transcended the metaphorical role and it has become the definition of the contemporary Feminist Movement and Theory, mostly thanks to its versatility and adaptability to the various fields (Carbin & Edenheim, 2013). It has become common knowledge within the feminist theory that women's experiences are conditioned by multiple intersecting systems of oppression (Carastathis, 2014) and it is no more feasible to analyze said oppression focusing solely on gender.

Intersectionality theory has been celebrated as the most important contribution that women's studies has made so far and its influence has been extended from the academic to the international human rights discourse (Carastathis, 2014). In the year 2000 intersectionality was mentioned by the United Nation's Bejing Platform and the Committee on the Elimination of Racial Discrimination, and it was recognized as a key concept by the U.N. Commission on Human Rights, in its resolution on the human rights of women (2002).

Although it is of crucial importance that the concept of intersectionality is being so widely adopted and adapted, by 'women's studies' and 'feminist theory' (which remain white-dominated discourses) as well as international academic environments and interdisciplinary fields, it is paramount to acknowledge and celebrate its origins in the Black feminist thought (Carastathis, 2014).

3 Scenarios

In this section, we present three realistic but made-up scenarios that present situations that highlight issues related to intersectionality during disaster situations, using persona that are similarly realistic but made-up characters that help illustrate these issues. Following each scenario, we will discuss how intersectionality affects the situation in the scenario and in particular the ability of the actors to use the relevant digital tools efficiently to cope with the situation.

The first two of the following scenarios are adapted from Gjøsæter, Radianti, and Chen (2019), and the third is based on a realistic situation in the current COVID-19 pandemic.

3.1 Earthquake in a City

In Reykjavik in Iceland, a strong earthquake strikes one day in late February, around 2AM in the morning.

Martin lives in a small 12th floor apartment in downtown Reykjavik. He is used to evacuating during fire drills, but this is different. He fights the panic as he awakes, puts on some warm clothes, grabs his smart phone, locks his apartment and quickly walks down the stairs among a crowd of other people, who are equally stressed and worried. He follows the directions from the Red Cross volunteers and manages to reach the shelter in a relatively short time.

His neighbor Alejandra has recently arrived to Iceland from Mexico to work on her PhD. In a panic, she didn't think of taking warm clothes with her as she left the apartment, that was never an issue in her home country. Fortunately, she remembered to grab her smartphone on the way out. She is now very cold, and the noise makes it even more difficult to concentrate on finding safe shelter. There is a woman wearing a Red Cross uniform coming towards her, but Alejandra doesn't understand what she is saying. She tries to find information about what is going on and what to do, but the government's websites and alerts are not in English and there is no time for translating them using apps. After looking around in confusion, Alejandra decides to follow the

crowd that is being directed *somewhere* she has no idea of, hoping in a quieter moment to request help.

In this scenario, we can notice a distinct difference between Martin and Alejandra. Martin is used to the place and the weather conditions. Growing up in Iceland has imprinted in him automatic actions, like picking up the winter coat when leaving the house, and these automatisms became crucial in an emergency situation, where his brain is focused on the terrifying things happening.

Alejandra, on the other hand, comes from a country with completely different climatic conditions and is not used to such low temperatures. In addition to the overwhelming emotion of the moment, she is now suffering the consequences of being a newly arrived immigrant in a foreign land, not only for the unfavorable temperature she is facing, but also due to the linguistic barrier she is facing when interacting with Anna and with the official websites of the government. Essentially, she is not sure about what is going on, where is she going, how long is it going to last, what are the safety measures she is supposed to take and so on. Furthermore, the moments she took trying to understand what was going on, both on the phone and looking around, could have been crucial for her survival.

3.2 Fire in a multi-floor shopping mall.

Just before closing time, a fire breaks out in the "Galleriet" shopping mall in Bergen, Norway. It was caused by an accident in the kitchen of one of the ground floor snack bars. The fire alarm goes off, and evacuation begins.

Bill is an American tourist on a one day visit from a cruise ship. He is a bit lost but finds a map on the wall. To his dismay, the information is only in Norwegian. He tries using google translate to translate the text, but because of stress he gives up and rather follows the crowd to the nearest exit.

Janne is on the top floor, and she is trying to use a smartphone indoor map of the mall to find the way to the nearest emergency exit. Along the way, she notices Hilde, an overweight person in a wheelchair who is unable to evacuate without assistance and is too heavy for her to carry. She sends a message about the trapped person to the local fire department using twitter, since the noise from the fire alarm is too loud for being able to communicate using the emergency phone number.

Nils in the fire department control center is overwhelmed by all the messages about the rapid development of the fire, but sees the tweet from Janne, calls Petter the fire fighter over the emergency communication network, and Petter makes his way to the top floor and is able to help the trapped person out of the burning building.

In this scenario we can see how three different persons are affected in different ways by the exact same event due to their pre-existent conditions. Bill, as a tourist, does not recognize exactly what is going on in the heat of the moment. Although he understands the need to evacuate the shopping center, he loses important time trying to figure out the indications on the floor map of the building.

Janne, on the other end, is a local and is aware of the existence of the smartphone indoor app and of how to use it. She can save time and direct herself safely to the nearest exit. Hilde, finally, is stuck on the top floor of the building because the elevators are

not working, for obvious reasons, and she cannot use the stairs. Additionally, she is not petite enough for Janne to carry her to safety and therefore will have to hope someone at the fire department will see Janne's tweet and the rescuers will be fast enough to save her.

In the scenario we depicted all of the characters managing to reach safety, but it is not hard to imagine how different the results could be in a slightly worse condition, as it is also evident who would be more vulnerable and why.

3.3 Teaching during a Pandemic

On the 11th of March 2020, the Italian government instituted a complete lockdown in order to limit the spreading of the COVID-19 virus. Italy was one of the first countries to implement such a drastic measure in response to the upcoming pandemic. From one day to the other, leaving home was not allowed unless strictly necessary, social interactions were completely forbidden, and all the schools were shut down indefinitely.

Eleonora is a primary school teacher; she graduated two years ago and was trained on the use of digital platforms. She immediately starts contacting her students' parents and trying to maintain contacts and organize alternative activities.

Her headmaster disposes the use of an official platform for the whole school, where teachers and students must interact after logging in with their school credentials. Unfortunately, Eleonora is a temporary teacher and was not granted the credentials to access this platform.

Ciro, one of Eleonora's 7-year-old students, got access to the platform right away, but has to share the computer time with his 4 siblings of 9, 11 and 14. All of them are now requested to join the online lectures and activities in order to keep up with their education.

Ada, their mum, is an essential worker at the local hospital and is absent from the house half day every day. She is extremely stressed by working a high-risk job in the middle of a pandemic, the activities in the hospital are frenetic and she is constantly under pressure, but her mind is also preoccupied about what is going on at home while she is not there.

Meanwhile Giovanna, Eleonora's senior colleague, cannot figure out how to upload the word file with the homework on the school platform. She calls Eleonora to get help, and Eleonora explains to her how to log into the WiFi network.

In this scenario there are several elements at play: the fear and anxiety related to the pandemic and the "invisible enemy", which is an experience none of the characters had ever experienced before, the work hierarchy, that prevents who has the knowledge from acting on it, the social class and economic conditions etc.

Ciro, for example, is extremely young and does not understand precisely what is going on. He is also in a vulnerable social-economic condition and therefore his access to the school's resources is limited; not by the institution, but because of the intersectionality of his condition. Ada, at the same time, is affected as a woman, due to being a single mother of four, as a low-income citizen and under a great amount of pressure due to her work conditions.

Because of their disadvantage, Ciro and his brothers will probably not be able to benefit from the online resources and digital lectures their schools provided. They will most likely lose a whole year of education, with all the consequences that will come with it in an already vulnerable household.

4 Universal Design of ICT

In this section, we examine how Universal Design of ICT can contribute towards reducing the effects of intersectionality.

The need for Universal Design in disaster situations is increasingly clear. Paupini and Giannoumis (2019) highlight the importance of Universal Design of ICT in disaster situations and refer to the United Nations Convention on the Rights of Persons with Disabilities (CRPD) where states are obliged to take all necessary measures to ensure the protection and safety of persons with disabilities in emergency situations. It has also been made clear (Gjøsæter et al., 2019; Gjøsæter, Radianti, & Chen, 2020) that especially in disaster situations, universal design of ICT can benefit a much broader audience than people with disabilities. They emphasize that while Universal Design of ICT is essential for people with disabilities in a disaster situation, it is also of utmost importance for people with so-called situational disabilities that can occur in a disaster, such as smoke and dust blocking the view, stress affecting our cognitive abilities, noise interfering with our hearing, and so on. However, as indicated in the scenarios above, Universal Design can reach even further when it comes to its potential benefits to a diverse population in a disaster situation.

Universal Design has attained an increasingly broad scope when it comes to research and theory. From the beginning it was clear that Universal Design is intended to provide a design that is useable for all, and as such should clearly consider and support the needs of not only people with disabilities, but also the elderly and people with situational or temporary disabilities, and people of diverse other vulnerable groups.

Conceptually it does not stop there. The closely related terms “design for all” and “inclusive design” makes it even more explicit that Universal Design should include everyone, and Universal Design of ICT should therefore ensure tools and technology that is indeed useable by everyone. Giannoumis and Stein (2019) argue that while Universal Design traditionally has been associated with persons with disabilities, a more nuanced understanding should also consider barriers encountered by all socially disadvantaged persons. They further state that “the complex, overlapping, and multidimensional barriers that exist at the intersection of multiple forms of social disadvantage should be at the forefront of how universal design is conceptualized.” Therefore, Universal Design should be understood to include intersectionality and social disadvantaged groups both in theory and practice. Access to digital services should be facilitated for all, not only for persons with disabilities.

However, this broad scope is not yet fully and consistently realized on the implementation level. There are clear guidelines like the Web Content Accessibility Guidelines (WCAG) (Kirkpatrick, O’Connor, & Cooper, 2018). These guidelines help ensuring that we have a well-defined way to use Universal Design aimed at disabled

persons (and in particular disabled persons with one single well-defined disability), but it is less clear, at least to the average software/web/user interface developer, how to broaden the scope of software development to produce tools that are fully accessible and useable by persons with multiple disabilities as well as persons whose identifies with or belong to other vulnerable groups. Unfortunately, the reality of recent tools and technologies for disaster risk reduction is not very encouraging. One might think that at least people with disabilities have been carefully taken into account in the design of tools and technologies for disaster risk reduction, but that is not always the case, as shown by among others Gjøsæter and Radianti (2018); Gjøsæter, Radianti, and Chen (2018); Gjøsæter et al. (2020); Radianti and Gjøsæter (2019); Radianti, Gjøsæter, and Chen (2017); Tunold, Radianti, Gjøsæter, and Chen (2019).

As shown in the scenarios in the previous section, issues stemming from the diversity of intersectional identities of people involved play a clear role on their chances of survival. As potential effects of intersectionality include low socio-economic status as well as reduced employment and education opportunities, it is clear that Universal Design should take into account a requirement for lightweight tools and technologies able to run smoothly on low-cost or old hardware, pay a particular attention to clear and simple culturally neutral language as well as ensuring that languages of significant minorities are supported, with visual support to the most important information to be conveyed.

In fact, these requirements are already supported by Universal Design guidelines, admittedly to a varying degree of detail. For example, the first Principle of Universal Design is “Equitable use”, and the third is “Simple and intuitive use”. Readability is also covered in WCAG 2.1 Guideline 3.1 “Make text content readable and understandable”. Just like Gjøsæter et al. (2019, 2020) argue that universal design can be able to mitigate some of the effects of situational disabilities, we think that careful application of the principles and best practices of Universal Design of ICT with intersectionality in mind can have a real and significant impact on the broader issues affecting vulnerable groups in a disaster.

5 Recommendations and Concluding Remarks

Universal design cannot by itself solve societal challenges related to inequality and discrimination. However, universal design can and should contribute to mitigate some barriers that are affecting these vulnerable groups. For example, the following groups can benefit from a Universal Design approach when designing software for disaster risk reduction:

- Persons with multiple disabilities.
  - Flexibility is key to handle this type of issues. It is important to provide flexible solutions offering alternative presentations and interaction modes, and to offer alternatives not isolated one by one, but available in combinations and in different contexts.
- Persons affected by linguistic barriers.

  - To mitigate linguistic barriers and reach as many as possible with emergency communications, it is important to use simple language, to provide alternatives, including relevant translations into important minority languages, explanatory icons, and explanations of difficult terms.
- Persons of low socio-economic status.
  - Apps and web pages for use in disaster situations should be as lightweight as possible, so it can run on cheap or old hardware, because not everyone can afford the latest and most powerful smartphones.
- Persons affected by cultural barriers.
  - Make sure that instructions are clear, explicit, logically reasoned, and complete, and not just vaguely implied based on cultural assumptions and assumed prior knowledge and training.

Based on our investigations, as exemplified in the scenarios, it becomes clear that intersectionality can make members of multiple intersectional vulnerable groups particularly at risk in a disaster situation. It is therefore paramount that intersectionality is fully taken into consideration when designing information systems for use in disaster situations.

Following the best practices of Universal Design and Human-Centered Design in implementing software for disaster risk reduction, applying the recommendations above, and ensuring a diverse (across all the relevant dimensions) group of users in user testing, will facilitate software that is contributing to a resilient society for all, and not only for the able-bodied and privileged.

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