

# Designing for women experiencing intimate partner violence

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### Abstract

This thesis explores design issues that should be taken into account when developing mobile services for women experiencing intimate partner violence (IPV). The aim of the thesis was to apply user-centred design methods and gain understanding of the situation and the needs of potential users of a mobile application aimed at women under a threat of abuse. The thesis explores the opportunities mobile technology could offer to women recovering from IPV. The threats posed by the violent environment and the attempt to develop ways to reduce the risks were emphasised in the research and design project.

The theoretical part of the thesis deals with the definition of intimate partner violence, the consequences of violence from a survivor point of view and the means of surviving violence. In addition, this section examines the risks and opportunities that information technology enables in abusive situations. The theoretical part is followed by a description of a design project aimed at developing a concept for a mobile application for women experiencing violence. The research on which the design work was based was carried out using user-centered design methods such as interviews, surveys and mapping the current operating environment and available services for survivors. The concept of the mobile application related to the thesis was evaluated using prototyping and usability tests. The thesis introduces the application concept that emerged from the design work and suggests principles to be used to support design in situations where users live under a threat of violence. The following principles emerged from the study: 1) safety and privacy, 2) validation and support for empowerment and 3) encouragement to reach out.

The findings indicate that mobile applications developed with user-centred design approach can provide beneficial tools for coping with IPV. The potential features were for example anonymous contact to support organisation, diary, and information on violence and safety arrangements. The study implies that it is possible to reduce the threat of violence related to the use situations. The study implies that the risk of violence when using the application can be reduced by for example protecting the content with a password, hiding the actual content of the application and sharing information about security and privacy. It is also important to recommend that the users evaluate their own security situation and act on their own assessment.

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**Keywords** UCD, User-centred design, IPV, Intimate partner violence, Design, ICT

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### Tiivistelmä

Tämä opinnäytetyö tutkii suunnittelutyöhön liittyviä kysymyksiä, jotka tulisi ottaa huomioon kehitettäessä mobiilipalveluita parisuhdeväkivaltaa kokeville naisille. Opinnäytetyön tavoite oli selvittää käyttäjälähtöisen suunnittelun keinoin potentiaalisten käyttäjien tilannetta ja tarpeita sekä kartoittaa mobiiliteknologian mahdollistamien työkalujen hyödyllisyyttä väkivallasta selviytymisen prosessissa. Väkivallan ympäristön aiheuttamien uhkien tarkastelu ja pyrkimys kehittää keinoja riskien pienentämiseen painottuivat tutkimus- ja suunnitteluprojektissa.

Opinnäytteen teoreettinen osa käsittelee parisuhdeväkivallan määritelmää, väkivallan seurauksia väkivaltaa kokevan näkökulmasta sekä väkivallasta selviytymisen keinoja. Lisäksi osio käy läpi kirjallisuutta tietoteknologian ja parisuhdeväkivallan riskeistä ja mahdollisuuksista. Teoreettista osuutta seuraa kuvaus suunnitteluprojektista, jonka tavoitteena oli kehittää konsepti mobiilisovellukselle, joka on suunnattu väkivaltaisessa parisuhteessa oleville naisille. Suunnittelutyön pohjana käytetty tutkimus toteutettiin käyttäjälähtöisen suunnittelun metodein. Menetelmät sisälsivät mm. haastatteluja, kyselyjä ja väkivaltatyön nykyisen toimintaympäristön ja palveluiden kartoittamista. Opinnäytetyöhön liittyvän mobiilisovelluksen konseptia arvioitiin prototyypin ja käytettävyydestutkimuksen keinoin. Opinnäytetyön lopuksi tutustutaan suunnittelutyön tuloksena syntyneeseen sovelluskonseptiin ja esitellään suunnittelua tukevat periaatteet tilanteisiin, joissa potentiaaliset käyttäjät elävät väkivallan uhan alla. Suunnitteluperiaatteet on ryhmitelty seuraaviin kategorioihin: 1) turvallisuus ja yksityisyys, 2) kokemuksen validointi ja voimaantumisen tukeminen 3) hiljaisuuden rikkominen.

Löydösten perusteella vaikuttaa siltä, että käyttäjälähtöisesti suunnitelluilla mobiilisovelluksilla voi tarjota välineitä väkivaltaisesta parisuhteesta selviytymiseen. Tärkeiksi toiminnoiksi koettiin mm. anonyymi yhteydenotto, päiväkirjatoiminto ja tieto väkivallasta ja turvallisuudesta. Tutkimuksen perusteella käyttötilanteisiin liittyvää väkivallan uhkaa on mahdollista vähentää erilaisin keinoin. Riskejä pienentää mm. sisällön suojaaminen salasanalla, sovelluksen varsinaisen sisällön kätkeyminen sekä tietoturvainformaation jakaminen. Käyttäjiä on myös tärkeää ohjata arvioimaan omaa turvallisuustilannettaan ja toimimaan oman arviointinsa perusteella.

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**Avainsanat** Käyttäjälähtöinen suunnittelu, parisuhdeväkivalta, tietotekniikka, muotoilu

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### List of abbreviations

DVSA	Domestic violence survivor assessment
ICT	Information and communication technology
IPV	Intimate partner violence
DV	Domestic violence
NGO	Non-Governmental Organization
PTSD	Post-traumatic stress syndrome
STEP	Survivor therapy empowerment program
UX	User experience
UCD	User-centred design
WHO	World Health Organisation



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# 1 INTRODUCTION

The global problem of intimate partner violence (IPV) is impacting on the health and well-being of significant number of women. The analysis of worldwide data on the violence against women (García-Moreno et al., 2013) demonstrates that intimate partner violence covers the major part of all physical and sexual violence towards women. Therefore, García-Moreno describes the violence against women as “a public health problem of epidemic proportions” (p. 43). According to her analysis, on average 30% of women (aged 15-69) who have ever partnered, have been physically or sexually abused by their intimate partner. Concurrently, 38% of all murders of women are committed by their partners. A survey conducted by European Union Agency for Fundamental Rights (2014) reveals the prevalence of physical or sexual violence against women by their partners in Europe to be slightly over 21% whereas in Finland the percentage is 30%. According to García-Moreno (2005), in non-conflict areas, the major risk of violence towards women is from their partners, in contrast to the abuse by anyone else, known or unknown to the victim.

As a consequence of the extent of IPV, the costs for societies are high. Aside the emotional and physical suffering on an individual level, two other types of costs have been recognized: loss of economic output and the costs of services such as social welfare, legal sector and health services (Walby et al., 2014). Hence the intimate partner violence is

often underestimated and treated as a private issue though it is indeed a significant global issue on both personal and societal level.

In order to protect the victims from domestic violence the legislation in Finland has progressed during the last 20 years. Some examples of the advancements are the criminalization of the rape in marriage in 1994. It took 10 more years to place assaults in private places as a subject to public prosecution. Amidst, the restraining order law was enacted in 1991. Still, despite the laws and public prosecution only small amount of the domestic violence cases end up in the courtroom. Most of the violent incidences occur in private residencies with no eye witnesses. Furthermore, the women and other family members are often reluctant to give a testimony against their partner and the Finnish law allows them to decline testifying against imminent family members. In conclusion, the hidden nature of domestic violence keeps it concealed from authoritative interference and makes it a challenging problem to intervene in.

In Finland public and third sector offer various services for the women experiencing domestic violence. The accessibility of the local services varies regionally. Online services mainly provided by third sector are available nationwide. Online services include information on the definition of different forms of abuse, safety information and contacts to support services. In addition, some associations offer online chats or facilitated online peer group programs.

Information and communication technology (ICT) in the context of intimate partner violence is a controversial issue. On the other hand, communication technology grants

an easy access to sources of information for abuse victims searching for help and support. However, the studies that explore the subject of technology facilitated stalking and harassment indicate that it is quite common both within and after the relationship (Marganski and Melander, 2015; Woodlock, 2016, Finn and Atkinson., 2009).

The growing usage of smart phones increases opportunities and threats for women in abusive relationships. So far the development of mobile based services supporting IPV victims are quite in the beginning. There are no active mobile services in the Finnish operating environment, hence this thesis explores the subject of mobile solutions in the context of IPV using user-centered design approach.

The practical aim of the thesis project was to develop a concept for a mobile application that supports women in abusive relationship. The design process was carried out in co-operation with a local association advocating domestic violence victims. The project resulted in a mobile application concept called Polku. The aim of Polku is to offer women tools to recognise and name their experiences of abuse, and support the survivors on their journey to recovery.

## 1.1 The scope of the thesis

The scope of this thesis is to follow the design process of a mobile application aiming to provide tools for women experiencing intimate partner violence, and explore the issue from a designer's perspective. The goal of the thesis is to gain understanding on the situation of domestic violence victims using user-centered design methods. To reach the goal this thesis explores the following question:



### **What to consider when designing mobile services for women experiencing intimate partner violence?**

The question can be further divided into three sub-questions.

#### **1 a) What are the specific user needs of women experiencing IPV?**

The experience of violence is traumatizing and difficult to solve for the abused. In order to gain understanding on the situation and the emotional state of the user, the thesis will look into the consequences of violence, the process of recovery and the process of empowerment.

#### **1 b) What kind of content and features could meet the user needs?**

The design process aims to develop practical solutions for a mobile service that could offer support for the women on their paths to recovery.

#### **2) What kind of solutions could improve the safety and privacy of the user?**

Safety and privacy issues in domestic violence situations differ from the general, usually anonymous and distant online threats. The threatening person is within reach of the victim and the consequences of online incidents are interconnected to the physical safety. The aim of the thesis is to gain understanding on the safety situation of abused women and examine the possible practical solutions that could improve the safety situation of the victims.

## **1.2 Background**

The design project was made in co-operation with Naisten Linja, an association providing support for women under threat or experiencing abuse. From Naisten Linja I got a brief that was based on a concept developed by Sonja Meriläinen, a student on an Aalto University

course organized with Naisten Linja as a client. The original concept was a mobile application that could be used to track emotions and store documents. The practical goal of my project was to develop the concept further with documentation and screens that could be used to develop an actual product.

## **1.3 Limitations**

Intimate partner violence can happen to anyone. However, this design and thesis project focuses on the experiences of women. The choice is consistent throughout the thesis and originates from the focus of the client.

As the subject of domestic violence is very sensitive for the affected women, it is usually not possible to work with primary users in the design projects. This was a challenge also in this project. The design research was concluded with Naisten Linja employees and volunteers of whom some had experienced and recovered from abuse.

## **1.4 The structure of the thesis**

The thesis consists of five chapters which explore the designing process of a mobile application for abuse victims. Chapter 2 introduces the common terminology of intimate partner violence and explores the theories on the process of recovery. First the chapter explores the consequences of abuse aiming to understand the situation of the victims needs as the user of digital service. The second part reviews the drivers of recovery attempting to provide insights into essential content and presentation of supportive digital services. The last part examines the literature on domestic abuse and communication technologies aiming to understand the promises and

risks of digital environment specific for the victims. The main remarks of the framework are summarized at the end of the chapter.

Chapter 3 presents the design and thesis processes, research methods and results. The UCD process is described using the four-phase double diamond design process model. Each phase contains both the research methods and the research results. Research methods include interviews, survey, benchmarking, stakeholder mapping and prototyping. The chapter ends with the summary of the main insights of the research. Chapter 4 intro-

duces the concept of the Polku mobile application developed during the process. Chapter 5 presents the design principles that were formulated based on the findings. The principles suggest consideration that should be taken into account when designing for users under threat. Three main topics of the principles are 1) safety and privacy, 2) validation and support for empowerment and 3) encouragement to reach out. Chapter 6 rehearses briefly the main insights of the research and discusses the further research suggestions.





## 2 THEORETICAL FRAMEWORK

The theoretical framework introduces the common terminology of intimate partner violence and explores the theories on the process of recovery. The first focal area is the consequences of abuse aiming to understand the situation of the victims' needs as the user of digital service. The second part reviews the drivers of recovery attempting to provide insights into the essential content and presentation of supportive digital services. The last part examines the literature on the relation between domestic abuse and information and communication technologies (ICT) and aims to understand the promises and risks of digital environment specific for the IPV victims.

### 2.1 Intimate partner violence: definition and consequences

A considerable amount of literature has been published on the topic of domestic violence, but only since the 1970's. Until that time, the issue of "wife beating" was overlooked as a private and trivial offence. The rise of feminism started the process of questioning the doctrine of husbands "correct[ing] their wives" (Clark, 2011, p.194). The concerns of research in the field have varied from the definition and causes to the interventions, prevention and recovery of family violence (Rhatigan et al., 2005; Butchart et al., 2010).

### 2.1.1 Definition of domestic violence

The violence occurring in domestic settings between family members is commonly defined as domestic violence (DV). When domestic violence involves current or former intimate partner the term used in literature is intimate partner violence (IPV) to distinct partner abuse from the child or elderly abuse. World Health Organisation (WHO) (2012) defines intimate partner violence as “any behaviour within an intimate relationship that causes physical, psychological or sexual harm to those in the relationship” (p. 1). Research has shown that IPV affects all types of relationships regardless of religion, social position or marital status. The abuse can also be mutual and happen in same sex relationships (Butchart et al., 2010; WHO, 2012). It is recognized that both men and women can suffer from IPV, though the majority of victims are women (Smith, 2003). In summary, partner abuse violates the integrity of victims in the place that should be safe, by a person who should be trusted. Furthermore, research indicates that there are no ‘safe’ types of relationships; anyone can/ could be the victim.

### 2.1.2 Common characteristics of intimate partner violence

Intimate partner violence can manifest in many forms. Generally, the acts of partner violence are defined to include physical assault, emotional abuse and sexual coercion (Butchart et al., 2010; WHO, 2012). Incidents of physical violence can vary from holding and pushing to severe violations with weapons. Psychological (emotional) abuse can be verbal such as name calling and threatening or non-verbal such as destruction of property.

According to Chamberlain and Levenson (2012), in addition to rape, sexual and reproductive coercion includes behaviours such as deliberate exposure to sexually transmitted illnesses, “forced non-condom use” (p. 7) and the sabotage of birth control. In addition to these types of violence, World Health Organization (2012) distinguishes behaviours such as spiritual oppression, financial abuse and neglect of care in their own category called controlling behaviour. Additionally, this category includes two significant patterns of abusive behaviour: the aim to isolate the victim from the outside world, and stalking. The topic of stalking is especially relevant in the context of digital environment as the progression of communication and monitoring technologies have expanded the possibilities for abusers to track and violate their victims. I will explore this issue further in the last section of the literature review.

Studies have recognized common characteristics and patterns in intimate partner violence considering the continuity and progression of violent incidences. For instance, Smith (2003) mentions that violence rarely happens just once but usually as a series of incidents shifting between emotional and physical abuse. She remarks that abusive behaviour often escalates from emotional abuse and controlling behaviour to more severe physical assaults. She argues that the longer the abusive relationship continues the more frequent and severe the violence becomes. Walker (1979) describes the deviating occurrences of violence as a three-phased cycle, developing from the seemingly calm, tension-building first phase to the second stage of the acute incidence of violence.

She calls the last phase of the cycle a “honeymoon phase” which entails remorse and loving behaviour. Life changing events such as moving together, getting married or having children have been recognized as possible triggers for the start or escalation of violence. It is known that the highest risk of severe violence and homicide is at the time of separation (Block et al., 1995). Even the suspicion of leaving can trigger the abuser. In conclusion, the patterns of intimate partner violence can, especially at the beginning, be subtle and therefore go unnoticed by the victim and her family and friends. Furthermore, violence can escalate to be very brutal and the extreme form of partner violence is death. The progress of arbitrary incidences cannot be predicted, but the cycle of abuse never starts with full force.

### 2.1.3 The consequences of intimate partner violence

The consequences of intimate partner violence on the victim have been widely studied. The studies agree that the health outcomes of women who are exposed to IPV are notably worse compared to the women who haven't experienced abuse (Bonomi et al., 2006; Campbell, 2002; Coker et al., 2002). All forms of violence (physical, psychological and sexual) are associated with negative health consequences which have found to affect physical and mental health, and social functioning of the victim (Bonomi, 2006). Findings indicate that prolonged and severe exposure to IPV implies to worse health outcomes (Bonomi, 2006; Campbell, 2002). In addition to the injuries of violence, the long-term physical symptoms such as chronic pain, central nervous

system problems and gynaecological issues are frequent within IPV victims. (Campbell, 2002). From the mental health aspect, the abused women are reported to have more depression, anxiety, insomnia and alcohol and drug abuse than non-abused (Bonomi et al., 2006, Campbell, 2002). Being a victim of violence is a traumatic experience and the symptoms of post-traumatic stress disorder (PTSD) are significantly higher within IPV victims than general population (Nathanson et al., 2012). On the social side, violence effects negatively on the participating in activities and trusting other people. (Bonomi et al., 2006). To conclude, partner abuse has significant consequences to the mental and physical health of the victim occupying and consuming prominent coping resources and making the serious situation challenging to solve.

## 2.2 Surviving an abusive relationship

Leaving an abusive relationship is known to be difficult for the victim and various reasons has been documented in the studies on the subject. In her article on recovery from partner abuse, Smith (2003) describes three levels of reasons: personal, community, and societal level, that make leaving from an abusive relationship difficult for the victim. From the personal level, she mentions reasons such as commitment to the relationship, feelings of responsibility for the abuse and feelings of obligation to help the partner. She also states the fear of revenge, financial deprivation or physical safety as possible reasons preventing leaving. At a community level the invalidating behaviour from others such as disbelieve, blaming of violence and suggestions to “work it out” (Smith, 2003, p. 544) are discourag-

ing the victim from acting on the situation. Landenburger (1989) mentions the stigma of being a victim prevents the women from getting help. On the societal level the cultural and/or religious constructions supporting women's dependence from men financially or socially makes leaving difficult. (Smith, 2003, Flinck et al., 2005).

To further describe the reasons to endure the difficult situation Smith (2003) mentions the psychological burden and the loss of energy needed just to survive and cope with the abusive circumstances leaves less energy for functioning. Living in denial of the situation for a long time is common behaviour for the victim and also a way to survive. (Frasier et al., 2001; Moss et al., 1997). Women often believe that they are the ones responsible to keep the family together putting the needs of their partner and children first on the expense of their own needs (Smith, 2003). The intensity of violence combined with the social isolation is disturbing the ability to perceive the situation and make decisions (Dienemann et al., 2002). In her paper, Kearney (2001) writes about the love and dreams women had of the happy family life of a mother and wife when entering the relationship and the devastation and disbelief after the violence first has occurred. According to her, when the abuse started, the women often were strongly dependent on their partner emotionally, socially, and economically. In her paper Landenburger (1989) describes that the reality of the victim "is not linear and is full of contradictions" (p. 16) with fluctuating feelings and reactions toward herself, the partner, and the incidents of abuse. According to her, the victim is living in two different realities: one 'false' real-

ity supported by others includes the positive views of the relationship, and in the other reality the abuse is simultaneously happening and denied. It is hard for a woman to make sense of the situation which lacks validation from others. As described above, the issue of violence in partnership is a complicated problem to solve because of the dependencies and feelings of shame, guilt and lack of support and validation.

### 2.2.1 The process of recovery

The process of recovering from an abusive relationship is a difficult journey. Several studies have been conducted to form theories of the process to provide the victim with adequate instructions and support (Frasier et al., 2001; Smith, 2003). Predictable phases of recovery have been discovered based on the activities and experiences that individuals undergo when making changes to their lives. The phases are described to be non-linear with victims going back and forth between different stages (Moss et al., 1997; Frasier et al., 2001; Smith 2003). Furthermore, a victim could be simultaneously in two or more stages and stay in one stage for years (Landenburger, 1989; Frasier et al., 2001).

In her retrospective study on the recovery process of IPV victims Dienemann et al., (2002) summarizes five studies with a theoretical analysis outlining the stages of partner violence victims surviving abuse. These studies have variety of connotations on framing and naming the different stages. Table 1 describes the different stages of recovery based on the domestic violence survivor assessment (DVSA) tool by Dienemann et al., (2002, 2007). The needs of the user are so



<b>Stage</b>	<b>Precontemplation</b>	<b>Contemplation</b>	<b>Preparation</b>	<b>Action</b>	<b>Maintenance</b>
	Committed to continuing	Committed, but questioning	Considers change	Breaks away or partner changes behaviour	Establishing new life apart or together
<b>Situation</b>	Victim denies and excuses violence and keeps it secret. Hopes to prevent abuse with loving enough. Sees abuse temporary and fears failing in relationship.	Victim questions blaming herself and admits it happening to self, but keeps it secret. Feels shame and tries to change herself. Fears prospective abuse. Stays for the sake of family, status etc.	Rejects the blaming of self, still makes excuses. Understands that cannot prevent the abuse and tries to escape it in work etc. Begins to identify with other victims. Conflicts with loyalty and injustice.	Considers perpetrator accountable.  Determined to act to end the abuse for her safety. Attachment and loyalty weakens.  Embarrassed of the situation.	Not tolerating abuse, if together. Avoids abuser. Seeks sanctions. Protects her safety against harassment and stalking. Rebuilds herself within new situation without violence. Feels justified in requiring change though some guilt may be left.
<b>Coping/ Recovery</b>	Denies own negative feelings, is stressed, keeps her feelings hidden and copes alone.  Doesn't believe anyone understands.	Loses herself pleasing the other. Anxious, depressed, may have PTSD. Copes alone to keep the relationship. Fears nobody can help.	Tries to recover identity and sets goals. Identifies herself as abused. Able to recognize feelings. Feelings of guilt. High anxiety. Fears for safety, but seeks initial help.	Critical about abuser. Recognizes feelings such as guilt and anger, and channels them to action. Seeks help and evaluates best sources. Gets treatment.	Self-identity healing. Evaluates the negatives and the positives of relationship. Anger weakens, hope rises. Accepts loss. Health and emotional consequences of IPV may persist. Ongoing treatments.

Table 1: Stages of recovery according to Dienemann et al. (2007)

dependent on the phase she is in, that these needs are crucial to understand from the design perspective.

### 2.2.2 Interventions on domestic abuse

There are plenty of studies on different types of interventions and their effectiveness for domestic abuse victims. McClennen (2010) describes the interventions as services addressed to IPV victims aiming to help them improve their lives. According to McClennen interventions are based on theoretical foundations with various approaches and they have been proved to be “successful and necessary, depending on the victim’s needs and situation” (p. 190). Despite the reported positive results,

the need for broad and long-term research on the effectiveness of the interventions is recognized (Stover et al., 2009). McClennen introduces common interventions for IPV such as crisis intervention, trauma therapy, survivor therapy empowerment program (STEP), feminist therapy and exposure therapy to name a few. Trauma-sensitive yoga incorporated in group therapy has shown promise as a tool for IPV survivors. (Clark et al., 2014) Some of the therapies focus more on the treatment of trauma, others to build the strengths and empowerment of the survivor. Group counselling is widely used form of intervention

and it seems that “the shared experience of having been exposed to IPV and the recognition of mutual survivorship” (Liu et al., 2013, p. 68) is effective in improving the condition of a victim regardless the specific theoretical approach. (Liu et al., 2013)

A counselling situation involving intimate partner violence has specific issues to consider. Usually the intervention support models are based on various types of theoretical frameworks such as cognitive behavioural therapy. Those frameworks have been further modified with professionals working with IPV survivors in order to anticipate to the requirements of abuse situation (Hansen et al., 2014; McClennen 2010). One of those IPV specific issues is the continuing threat of violence causing the need for tools to assess the level of the threat during the intervention. Furthermore, safety planning is required in order to protect the women and her children from the perpetrator (McClennen, 2010; Warshaw et al., 2013). If the victim and her abusive ex-spouse have had children together she may have to maintain some sort of a relationship with her tormenter (Stover et al., 2009).

Overall, the challenge with intervention is the diverse problems women are dealing with typically on many domains of their lives. Besides surviving the abuse, they might need to cope with financial insecurity, navigate the legal system, look for affordable housing, care for their children, tackle substance abuse and so on (Warshaw et al., 2013). Therefore, McClennen emphasizes the need for proper training and resources for the supportive personnel working with IPV victims.

### 2.2.3 Empowerment in the context of IPV

The concept of empowerment is widely discussed in the context of recovery from intimate partner violence. Based on their retrospective research Cattaneo and Chatman (2010) attempt to conclude the fragmented research and terminology on empowerment. In their latter paper (Cattaneo and Goodman, 2015) they associate the model with intimate partner violence. They define empowerment:

as a meaningful shift in the experience of power attained through interaction in the social world. The model describes the process of building empowerment as an iterative one, in which a person who lacks power sets a personally meaningful goal oriented toward increasing power, takes action, and makes progress toward that goal, drawing on his or her evolving self-efficacy, knowledge, skills, and community resources and supports, and observes and reflects on the impact of his or her actions (Cattaneo and Goodman, 2015, p. 1)

Furthermore, Cattaneo and Goodman describe empowerment as both: a process and an outcome. The process includes the steps taken towards the defined goals and the evaluation of the impact of the action. Yet, it is possible to ask about the outcome and the feeling of empowerment of the survivor at any part of the process (2015). Considering the criticism, it is important to understand the outcome as something evaluated by the survivor and not as an outcome defined by service providers. (Kasturirangan, 2008; Cattaneo and Goodman, 2015) Cattaneo and Goodman (2015) address the services as just one of many resources the survivor has on her way

to recovery. Further, Cattaneo and Goodman define empowerment as domain specific. A person might simultaneously feel empowerment in one field of life such as work or studying, and at the same time disempowerment in another, for example on the domain of intimate relationship. Cattaneo and Goodman state that empowerment is more than a psychological construction. To feel empowered is not enough, if the empowerment has no effect on the social interaction. They conclude that empowerment involves an interplay of social outreaches with psychological consequences which further affects social interactions.

Aside the action and social context, Cattaneo and Goodman (2015) further describe more aspects of the empowerment process model: goals, self-efficacy, skills, knowledge, and community resources and impact. They define the goals of the survivor as personal and varying depending on the individual. It is important for the support service provider to recognize and understand the differences between individuals and their goals and keep the support process flexible and survivor centered. The goal can be for example financial independency containing sub goals, such as finding a job. Cattaneo and Goodman make the notion to avoid offering the survivor a menu-based solution built on existing services and solutions, instead discover the individual needs and circumstances of the survivor.

Cattaneo and Goodman describe self-efficacy as the survivor's perception of her abilities to achieve her personal goals whereas skills are the actual means needed to accomplish the goals. Skills, in the context of their example of financial independence, could be the ability to write a resume. Knowledge

is the comprehension of what must be done to obtain the goals and what kind of systems might support or prevent the change. As the knowledge expands, it might lead to redefinition of the initial goals. Community resources consist of informal support such as friends and family as well as formal systems. At this point it is essential to notice the significant differences on the access to resources between individuals (Kasturirangan, 2008). Impact is one of the key concepts in the process of empowerment (Cattaneo and Goodman, 2015). In order to evaluate the impact during the process the survivor reflects on her "progress, both in terms of internal experience and external change" (p. 88). She is evaluating her actions and reflecting on her possibilities in the future. Impact is an important guidance of what is useful, what has improved, and where to go next. Cattaneo and Goodman emphasize the importance of the social context when considering impact, as similar actions can lead to different or even opposite outcomes depending on the social surroundings. For example, the reaction of a trusted person can vary from total rejection to validation, and hence lead to totally different impact.

#### 2.2.4 Arrangement of support

Based on her retrospective study on trauma-informed practice to partner abuse Wilson et al. (2005) present six clusters of practices to consider when offering support for IPV victims. The clusters are formulated for the context of interventions in physical spaces such as shelters, but several parts of the approach could be applicable to online context as well. The comprehensiveness of these clusters is supported by a paper by Grie-

der and Chanmugam (2013) applying environment psychology in the spatial design of shelters. Both papers take into consideration both the environmental arrangements of the shelter and the means and practices to offer support for violence victims. The clusters Wilson et al. (2015) introduces are: 1) In an aim to promote emotional safety Wilson et al. (2005) highlight the need to create a familiar and comfortable space. Grieder and Chanmugam (2013) approach the subject in terms of “reducing and eliminating environmental stressor” by utilizing space proportions, colours, lighting and other architectural elements. On encounters with the advocates Wilson et al. emphasize the importance of being compassionate and accepting. She proposes the use of respectful language and suggests considering the tone and choice of words carefully in a transparent and predictable way.

2) To promote the choice and control Wilson et al. suggest that shelter workers offer support seekers the time and space “to tell their stories” on their terms (p. 590) and support the agency of survivors. Grieder and Chanmugam recommend encouraging the agency by giving the survivor the control of environmental choices such as lighting, use of devices and also making wayfinding effortless. In spatial context, they propose privacy-sensitive approach with different types of spaces providing the survivor a choice over the level of social engagement. Regarding the content Wilson et al. highlight the importance for the client to have the possibility to personalize the content and focus of supporting services. Grieder and Chanmugam also point out the significance of providing personal choices in shelters, for example in furniture to suit the

survivor and her family’s needs.

3) To enhance connections Wilson et al. emphasize the need to support the social relationships of the survivors with their friends and family, advocates and other survivors. According to Grieder and Chanmugam, in shelter environment this could be achieved by dedicating and organizing rooms for diverse social encounters with public and more private choices.

4) Wilson et al. instructs the advocates to support coping of the victims by using an approach and materials specifically aimed to educate survivors on the issues of domestic violence. Advocates are suggested to validate the traumatic experiences of survivors and aim to help survivors recognize their emotions and triggers. Wilson et al. recommend helping victims use and develop their coping skills with the approach of “a holistic culture of healing” (p. 592). As an example, Wilson et al. mention some details such as communicating the hope of healing, sharing of positive affirmations and supporting physical activities to reduce stress. In association to this cluster Grieder and Chanmugam use the term positive distracters that can be used to guide attention from negative and anxious thoughts to more positive thought patterns giving the examples of calming music or nature elements.

5) The fifth cluster underlines the importance of being responsive and inclusive to the different backgrounds of survivors such as sexual orientation, abilities, culture and social context (Wilson et al.). In this context Grieder and Chanmugam emphasize the importance of universal design; an approach promoting the design for accessibility and usability dis-

regarding the age or ability of the user and without the need for special adaptation.

6) In the sixth cluster Wilson et al. emphasize the recognition of strengths of survivors and the value of providing opportunities to develop survivors' leadership skills and decision making in order to oppose the lack of self-efficacy that follows when being a victim of IPV. They mention that a question as simple as asking how the survivor has made it thus far, can be a meaningful start.

## 2.3 Information and communication technology and IPV

ICT and phones have long been used in contacting support services and as a controlling and stalking tool by the abusers. However, the availability of research on the usage of mobile technology supporting domestic violence victims seems to be limited. Hence, I will explore the subject of mobile solutions in the wider context of health care and refer to IPV specific research when possible.

### 2.3.1 Information and communication technology and stalking

ICT usage within the intimate partner violence cases is a double-edged sword. Technology grants an easy access to diverse sources of information for abuse victims to search for help and support. Simultaneously the same technology provides numerous possibilities for abusers to stalk and harass their victims.

According to Finn and Atkinson (2009) IPV often involves controlling behaviour. The controlling abuser pursues to increase the victim's dependency on the abuser limiting her connection to outside world. This controlling pattern includes the control of the

usage of ICTs aiming to prevent the victim from reaching to the outside world and support systems (Woodlock, 2016). Stark (2007) argues that stalking is part of coercive control; oppressive behaviour by abuser such as isolation, restricted mobility and regulation and control of daily tasks of the victim. The development of ICT has provided the abusers with new tools such as computer networks, mobile phones, global positioning systems (GPS), wireless audio and video recorders and social media. (Southworth et al., 2007; Woodlock, 2016). The few studies that explore the subject of technology facilitated stalking and harassment indicate that it is quite common both within and after the relationship (Marganski and Melander, 2015; Woodlock, 2016, Finn and Atkinson., 2009).

In her research Woodlock (2016) examined the additional opportunities that mobile technologies provide for stalking and harassment. According to her research, the most common method of misuse was using the phone for harassing and name calling, reported by 78% of the IPV victims in the study group. The second most common method was the usage of location features of mobile technology (56%). Quite common activities were spying the messages, threatening through different channels and shaming and attacking the victim through social media platforms. In addition, abusers were reported to use GPS tracking, force the victims to give passwords, impersonate the victim and use other people to reach the victim. The research by Woodlock (2016) reveals the difficulty of victims to fight the situation, as blocking the abuser from private content can lead to higher risk of violent assault. Control and compromised devices can prevent

victims from using Internet or mobile phones to search for help and support.

Based on her research, Woodlock (2006) describes three different tactics that abusers use to intimidate the victims using ICTs. The first she discusses omnipresence, the tactic used by stalkers to make the victim feel that the stalker is everywhere and knows everything. This makes the victim feel that she hasn't got a safe place, security, nor privacy. According to Woodlock the most common way to accomplish the omnipresence with the help of technology is the constant messaging and calling to the victim. The abusers know that the women have their mobile phones with them all the time. Tracking and location sensitive information is used to reveal the whereabouts of victims. Social media gives stalkers additional means to track and follow the victim. Woodlock mentions that Facebook has been used for proxy stalking, which means the abusers use other people to keep themselves up to date with the victim's actions. Woodlock reports several people saying that they were bombarded with messages from the friends and family of the stalker. This further increases the feeling of the victim of being under constant surveillance.

The second theme that Woodlock identified as impacted by technology is isolation. Abusers aim to make the victims more dependent, dominate their time use and isolate them from their social connections. Due to the stalking, victims may be forced to change their phone number, close their social media accounts and even move. This alone harm their social connections and accessibility. Furthermore, abusers harass and threaten the friends and family of victims to receive information. Perpetrators

post rumours and lies on social media to publicly harass their victims who may lose social support in the process. One method of violating the social relations is to hijack the social media accounts and impersonate the victim. It is difficult, if not impossible, to regain control of an account once the password has been changed.

The third tactic of perpetrators Woodlock observed is the use of ICT for punishment and humiliation. Perpetrators often aim to embarrass victims to silence them. Aim to silence their victims through shaming. According to Woodlock the harassment is usually sexual. Perpetrators threaten or actually send humiliating content about the victims to their communities, friends, families or kids to see. In social media, abusers have a powerful tool to broadcast degrading material fast and easily, sometimes causing the humiliating situation to escalate quickly. The community might turn against the victim and thus support the abuser in his assault, which can be extremely hurtful for the victim.

ICT facilitated tactics of abusers are well-recognized by advocates and shelters, social workers and in research. IPV organizations are recommended to assess their policies regarding the internet and mobile technologies and provide training and information for victims (Southworth et al., 2007; Finn and Atkinson, 2009). According to Finn and Atkinson both the advocates and survivors are expressing enthusiasm and need for technology-based training. Research indicates that safety planning should include the awareness and education of technology. (Southworth et al., 2007, Finn and Atkinson, 2009). Furthermore, survivors have communicated

the usefulness of technology education providing post-shelter skills such as finding a job or establishing social network (Finn and Atkinson, 2009). General consciousness of the vulnerable situation of partner violence victims should be further raised, discussed and recognized especially within organizations providing services for domestic violence victims including health care, government agencies and courthouses. (Southworth et al., 2007). Finn and Atkinson also mention their respondents' suggestion of "broad community education about technology and violence" (p. 58) indicating the need to teach these matters in schools, social services and within other interest groups. These potential threats are crucial to keep in mind when developing online or mobile services for domestic abuse victims.

### 2.3.2 Promises and challenges of mobile technology

The usage of mobile technologies related to health and well-being has been rising rapidly and a variety of possibilities has been recognized and studied from the aspects of health, mental health and common well-being. The availability and affordability of mobile devices with growing processing power and the sensing technology open up new possibilities to develop and distribute health services. (Liu et al., 2011; Donker et al., 2013; Klasnja and Pratt, 2012; Huguet et al., 2016) Personal and portable devices enable real-time connection with health-care providers offering flexible possibilities for remote messaging, coaching and real-time symptom reporting with journaling or automated sensing. Adding social level brings in peer-to-peer interaction and

possibilities of social support from family or friends. Mobile technology increases the accessibility to personal health information, enables automated feedback and personalized content delivery without effort (Donker et al., 2013; Klasna and Pratt, 2012). Lately big data and artificial intelligence are predicted to revolutionize healthcare.

Although the potential of mobile technology is prominent, several challenges rise along. Privacy and security is a well-recognized issue. (Levin, 2012; Donker et al., 2013; Luxton et al., 2011) Unsecured networks and lost or stolen devices pose a risk when users transmit and store personal information in smartphones and cloud services. (Levin, 2012; Luxton et al., 2011). As anyone can publish an application, the control of software quality and the personal data management on the service providers' part are questionable. (Luxton et al., 2011) The research on the effectiveness of mobile applications is considered insufficient (Donker et al., 2013, Luxton et al., 2011). Acceptance and usability introduce another set of challenges. Adopting new and constantly changing technologies can be demanding for some users. The application design should be user-centred and pay attention to workflow and user experience. Usability and reliability of mobile services suffer in case of technical issues such as connectivity and bandwidth problems, device failures or loss of data. (Levin, 2012; Donker et al., 2013; Luxton et al., 2011). From the service provider's perspective, there are challenges in keeping up with the developing technologies and moving markets. The high expenses of development, accompanied with the lack of funding and need for experienced IT staff is a

financial burden. Reluctance towards technology and change can also be an issue. (Morgan and Agee, 2012). According to Morgan and Agee, a solution for smoother processes is to excel the application design of workflows and user experience with user-centred approach.

The field of the mobile health applications is lacking empirically tested applications. (Huguet et al., 2016). In their systemic review of cognitive behavioural application aiming to treat depression Huguet et al. raise their concern on how these applications could be relied on in treatment. They also mention that this critique is consistent on other health fields.

### 2.3.3 On the online tools and services for IPV survivors

Gilroy et al., (2013) have surveyed survivors on their preferred ICT methods with the formal sources of help such as health care providers and law enforcement. The results indicated the preference of traditional phone calls and face-to-face communication over text messages, e-mails or social media. Respondents addressed to have safety concerns about digital messaging. Nevertheless, text messages were quite popular amongst the respondents. Facebook was favoured only by few respondents. The respondents participating in the research were first-time support service users and it might have affected the results. The authors hypothesize that considering the different situations and needs of the clients, different methods may have an applicable usage spanning from daily reminders to psychosocial support. They state the need to further examine the preferences of IPV victims and the helpfulness of different communication methods.

The search on the literature on available online services provided two application examples, MyPlan and I-Decide, which are based on research made in attempt to develop an online intervention and personal safety planning tool. The research indicates that these tools are promising as “a single session with the computerized safety decision aid was beneficial to abused women” (Glass et al., 2010). MyPlan offers a native mobile application and equivalent tool for browsers whereas I-Decide is solely Web-based application. Both services provide tools for self-reflection on the health and safety of the relationship and an action planning to help making safety decisions that are needed in the current situation of the user.

The online articles about journaling or other note-making in the context of (IPV) intimate partner abuse concentrate on keeping track of incidents of abuse and collecting evidence. (Break the cycle, 2014; Domesticshelters.org, 2015; Loveisrespect.org, 2017) According to the articles, documenting abuse can help to identify the abusive behaviour, but it can also help to prepare for legal actions, if needed. Instructions on the sites recommend writing down every incident with the date and time and attaching witness statements, if available. All injuries need to be described and photographed. Perttu and Kaselitz (2006) further recommend using objects such as coins as a scale to indicate the size of the wounds and include recognizable facial image in at least one of the pictures. The scene should be documented and photographed as well. Additionally, some sites instruct to write down the feelings.

The advocate sites of IPV survivors consider all digital evidence as important. All



messages are recommended to be printed or stored as screenshots and telephone calls recorded. The sites give tips on how to safely store the notes for example into secret email

addresses, password protected online diaries and preferably storing paper documents outside a shared residence.

## 2.4 The highlights of the theoretical framework

### Intimate partner violence

- IPV is progressive and cyclical by nature
- The consequences of IPV are both psychological and physical
- Leaving an abusive relationship is difficult due to the personal, community and societal reasons such as fear and shame, disbelief of others and cultural constructions supporting women's dependence from men socially or financially.

### Surviving an abusive relationship

- The process of recovery from abuse is a difficult, non-linear journey. Victims can go back and forth between different stages, be simultaneously in several stages or stay in some stage for years.
- Various interventions are developed for abuse victims and safety planning is an essential part of them.
- Empowerment is both a process (survivor's goals, actions and evaluation) and an outcome (the survivor's feeling of empowerment at any point of the process). Outcome is something evaluated by the survivor.
- Survivors can be aided by arraigining the assistance in a recovery-supporting way. This means for example taking into account their personal needs, supporting their agency, personal strengths, social relationships, and communicating the hope of healing in a familiar and comfortable space.

### Information and communication technology and IPV

- The usage of ICT and the online tools for survivors is promising, but there are safety concerns in using digital services.
- Perpetrators use various ICT based tactics to control, harass, and isolate their victims which creates a feeling of the abuser's omnipresence.
- There is a need for education about technology and violence for the victims as well as broad audiences.
- Overall availability and affordability of ICT advancements open new possibilities to distribute health services, but there are risks and challenges for example in safety, privacy and data management, adaptation of new technologies, usability and reliability.
- There is a lack of research on the effectiveness of ICT supported health interventions and services. The usage of ICT and the online tools for survivors is promising, but there are safety concerns in using digital services.



## 3 THE PROCESS, APPROACH AND RESEARCH RESULTS

This section explores the user-centred design (UCD) approach, design research and thesis processes including the methods used in the research. Following the British Design Council's proposal (Design Council, 2007), the UCD design process used in this thesis has four phases: discovery, define, develop and deliver. These phases consist of context of use, requirements, design solution and evaluation, respectively. In this chapter, the phenomena of recovery from abuse and challenges and opportunities of mobile and digital environments are integrated to the process and methods. The research results are reported in the respective UCD process phase.

In this study, I have used benchmarking and stakeholders as methods to conduct research on the use of ICT in the context of IPV. Benchmarking is used to explore available applications and services for IPV victims, and mapping and comparing the features. The results of benchmarking have been applied in the designing of the Polku concept. Stakeholder mapping is used to explore and illustrate the potential network of support. All used research methods of each phase are illustrated in Figure 1.

### 3.1 User-centred design approach

User-centred design is an iterative process where the design solutions are evaluated against user goals and needs throughout the development. In the UCD process designers are in contact with the primary and secondary users to do design research their needs and potential usage of the product. In addition to communicating with the actual users, designers draw on any other sources that support creating services based on the abilities, capabilities, and tasks of the user. (Abrams et al., 2004; Ritter et al., 2014). The level of involvement of the users can vary. At the minimum, the users participate in the requirement gathering and usability testing. When the users are involved in the entire process, the approach is called participatory design or co-design. The approach involving the users in the entire process is Participatory design process. It aims at a deep impact and partnering with the users. Commonly in the UCD projects, it is recommended to have multidisciplinary teams consisting of for example psychologists and anthropologists. Other parties frequently involved in the design process are stakeholders and development team, so the complete process requires plenty of human resources. (Abrams et al., 2004).

### 3.2 Design process

The design process is depicted by the double diamond design process model developed by The British Design Council in 2005. The double diamond diagram consists of four phases mapping the different stages of design. In the discovery phase, with design research methods, the aim is to gather insights and understand the current conditions and user needs

of the chosen phenomena. In the definition phase the intention is to use the insights to specify the most relevant and compelling opportunities. The third phase, the development, is about the iterative exploration of potential solutions. In the last phase, the plans are implemented and tested before the specific solution is delivered. (Design Council, 2007).

Figure 1 is an adaptation of the original double diamond. To emphasize the flow of iterations the arrows were added according to a double diamond version in an article by Liu (2016). The design methods specify further each phase of the design. Under the double diamond there is the thesis timeline that was concurrent to design process.

The following chapters will go through the methods used in each phase more closely. Design work was mainly my responsibility, but I occasionally collaborated with another designer who helped gathering requirements and developing the concept, and reflecting on the findings. Working with the issue of domestic violence can be exhausting, not only because of the devastating stories of the survivors, but also for the responsibility making choices of content and features. The evaluation and close work with the advocates and survivors is crucial.

### 3.3 Phase I: Discovery and insights

To understand the needs of the potential users the design process started with familiarizing the phenomenon. The preliminary research was based on discussions with Naisten Linja employees, popular articles, books and guides. One significant source was blogs of survivors and open forums to find out how abuse victims communicate their situation. The aim of

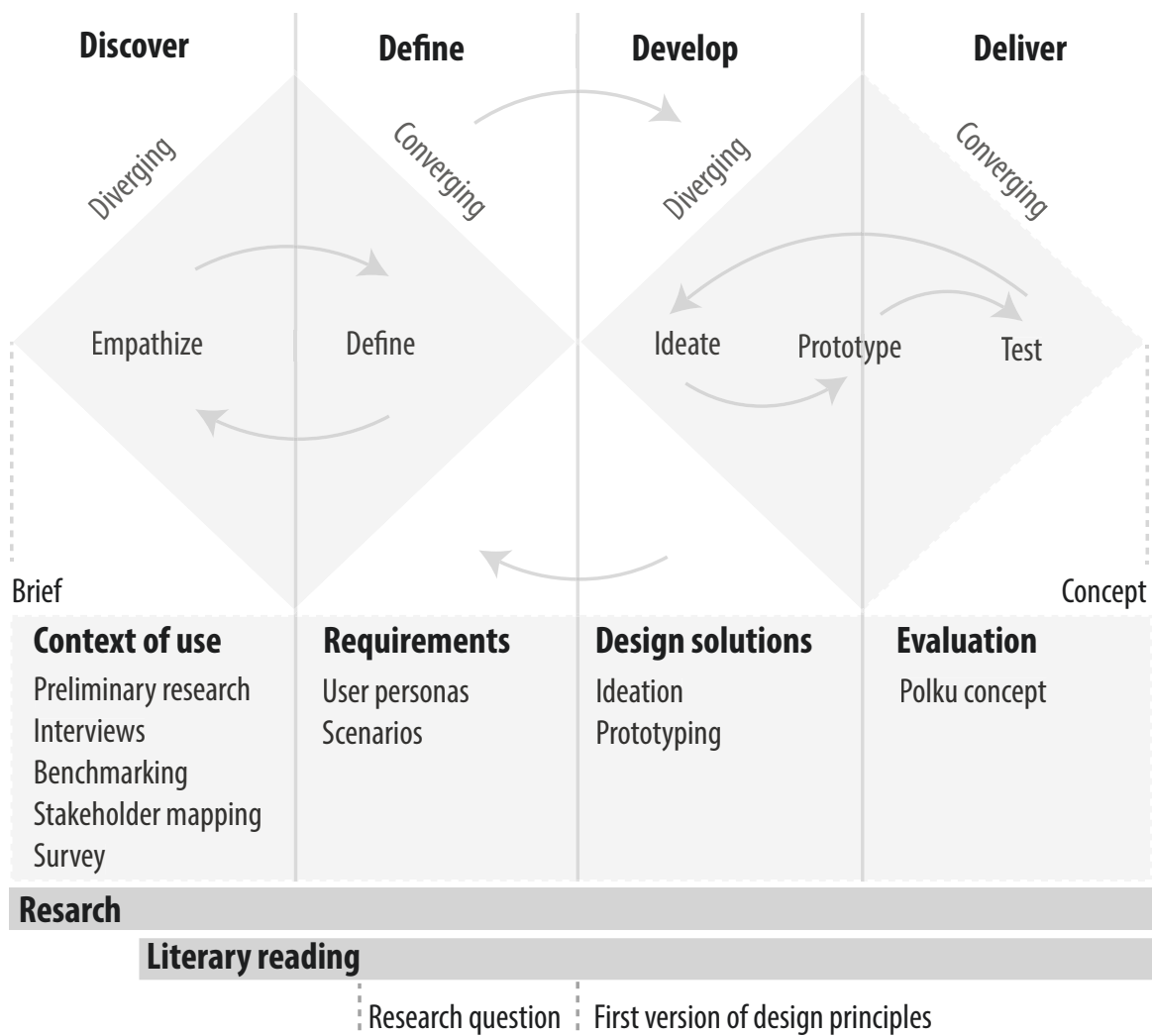


Figure 1: The thesis process (based on the Double Diamond model, British Design Council 2007)

preliminary research was to gain the basis of the terms and recurring patterns to start the design project and continue with interviews. The personal stories of women were also a good basis forming the personas later in the process.

One insightful observation during the preliminary research came in a meeting with a woman who had been living under a death threat. During that time, she said she had a device from a security company that had two buttons. The other button alerted emergency

services and the other invoked a call from the security company. She said that in her mental state she could not have been able to use a device with any more buttons. Another interesting remark from the conversations was the observation that it is quite common that abusers break the phones of their victims.

Five interviews occurred with employees and volunteers working for Naisten Linja, a psychologist facilitating support groups, and a researcher who has studied violence against women. One of the interviewees had experi-

enced violence herself. The interviewees had different backgrounds and knowledge areas so the questions were modified personally for each of them. The common aim of interviews was to gain understanding on the violent situation from the perspective of victims and to discuss the possibilities and risks of using a mobile application in violent situations from different standpoints.

The information and insights of the interviews are in line with the literature. Few topics were frequenting throughout the interviews. One of those was the individuality and unique process of each survivor. For example, when reaching for help some women are further in their process of recovery and considering their choices. Whereas other women might barely dare to think that there is something wrong. Seeking help takes a lot of effort and the interviewees told that when the women finally pursue help, approaching authorities can be traumatising. Some women have even been laughed at when they have taken their cases to the police. There is a risk that failed call for help can regress empowered women back to passive state.

The interviews emphasised the importance of identifying and naming violence. It is not axiomatic that women experiencing violence are searching for help. Difficulty to make sense of the situation often derives from the difficulty to identify violence that happens at home compared to, for example, the violence happening in the streets. Some reasons for that are the confusion caused by emotional abuse, and cyclic occurrence of violent incidents that lead the women to question their own feelings and analysis of the situation. Furthermore, victims often undermine the

violent experiences and interpret the situation for the better. For example, explaining the behaviour of their partner with his personal difficulties is common.

All the interviewees mentioned the traumatizing effects of violence. One of them mentioned that some women fall into such bad mental condition that they aren't eligible for rehabilitation therapy, and are in danger to become marginalised and excluded from work life. She emphasised the responsibility of the society to support recovery, since everyone will pay the costs if nothing is done. Using violence as a solution is also highly heritable and hence breaking the cycle is important also on the societal level.

Abuse victims need means and resources to build their self and self-esteem. In discussion on the potential risks of the application, the emotional risk was especially worrying. The concern on emotional well-being was associated to the diary function or other self-reflection tools. The feature of tracking emotions raised the question of how to ensure in an application that negative emotions don't lead to self-blame. There is a risk that the victim interprets the undesirable situation through the voice of the abuser. She might think that what is happening is all she deserves. This can be harmful and lead to aggravation of depression. Instead, the disturbing emotions should be processed understanding that this is how violence feels. Sadness, hopelessness and self-blame are normal reactions after experiencing violence. These unpleasant feelings exist to communicate to the person experiencing violence that she is being mistreated and this is a normal reaction to abuse, not her destiny.

Time after separation was also mentioned

as an emotionally vulnerable time related to the use of an application. After the awareness on abuse has grown, comes questions such as ‘How could I let myself be treated like this?’. The acute situation, in which the victim had to act and make decision, is followed by an avalanche of emotions. The victim might feel desperation and depression. One of the interviewees described this as risky situation for using any self-reflection tools, especially alone. In the path of recovery some feelings need to be dealt with, but preferably with a safety network. Another risk we discussed extensively was the safety of the users. Violent partners can be ruthless and persistent hence safety and privacy issues should play a significant role throughout the design process.

Interviews covered also discussion on the features that the application could have. The interviewees clearly considered that concentrating on emotions in the diary is a possible risk. Nevertheless, making notes could still be an opportunity in a situation where violence has caused fragmented and disorganised thoughts and short-term memory loss for the victims. Personal experiences stored in an application might not be valid evidence but could help the women to remember and communicate the situation to others, if a time for that would come.

According to the interviewees, the users could benefit from information on the forms of violence and on safety planning. There is a lack of information access especially in the context of digital safety. Interviewees emphasized the need for personalization and reactivity to the individual situation. Additionally, they stated the need for compassionate and positive messages and tone of voice. One sur-

vivor said that she sees an opportunity for the application to be a neutral messenger and not as intrusive as other people might be. The app should not just help the women to recognise violence but their own resources and opportunities as well. The app should remind the abuse victim that she is valuable and her well-being matters in contrast to the violent experiences that is diminishing her self-worth.

Naisten Linja employees said that albeit the mobile devices being unusable for some women without safe access or necessary skills, with the application Naisten Linja could reach and provide value and benefit to new audiences. They wondered if the application could offer something for the women who cannot attend to the support groups. A valid reminder was to limit the application features and to not try to make everything for everybody because of the different needs during different phases of recovery.

### 3.3.1 Benchmarking available services and tools

Benchmarking is the process of analysing the quality and standards of existing products or services in the field of interest and figuring out what could be done better. (Elmuti and Kathawala, 1997). In this project, to gain insights on the services for IPV victims, comparable solutions were explored. This exploration does not concentrate solely on digital services, as it is important to understand how digital services could complement existing offline services.

In Finland, the services for domestic violence victims are provided within health, social and psychiatric services of public sector and by various non-governmental organisations (NGOs) and religious organizations. NGOs organize local and nationwide services

<b>Applications</b>	<b>Features</b>	<b>Information on violence</b>	<b>Assessment tools, safety evaluation</b>	<b>Connection features</b>	<b>Secret web browser</b>
<b>Daisy (Australia)</b> <sup>1)</sup>		Information on IPV		Possibility to call to emergency number and add own contacts, helplines	Web search and access to help providers in Australia
<b>Buzz news</b> <sup>2)</sup>		Help contacts		Calling to local help lines	
<b>Aspire news (USA)</b> <sup>3)</sup>		Help contacts		Calling to local help lines	
<b>Myplan</b> <sup>4)</sup>		Information on healthy relationships and violence	Safety and value assessment tool		
<b>I-decide</b> <sup>5)</sup>		Planning tool	Safety and value assessment website	Contacts in Australia	
<b>Circle of 6</b> <sup>6)</sup>				Add connections to inform them in case of threat, share location, help line calls	
<b>Boyfriend log</b> <sup>7)</sup>				Send SMS	
<b>SmartSafe+</b> <sup>8)</sup>					
<b>Help me</b> <sup>9)</sup>				Calling 911 and predefined numbers, location sharing	
<b>iMatter</b> <sup>10)</sup>		Videos	quizzes		
<b>Aurora (Australia)</b> <sup>11)</sup>		Information on the warning signs, where to contact		send preformatted sms messages	
<b>Re-focus</b> <sup>12)</sup>		Information on violence and legal matters		Contacts and calling to UK support resources	
<b>Bright sky</b> <sup>13)</sup>		Information, online safety guide, questionnaires		Emergency calling	
<b>Live safe</b> <sup>14)</sup>		Safety resources and phone numbers		Sending pictures, video, text and audio to community safety officials, location sharing, emergency calling, chat option with organizations and friends	

Table 2: A sample of applications (sources retrieved 17.2.2018)



Diary/ Evidence collection	Positive affirmations	Safety features	Personalization	Warning on store	Downloads (Play store)
		Quick exit		Yes	1000-5000
		Disguised as news app		No, news app	100-500
		Disguised as news app		No, news app	Tarkista!
		Pin	create safety plan, evaluate priorities	Yes	1000-5000
			Personalised suggestions based on		
					10000-50000
Moodtracker		Pin		?	?
Text, video, voice recordings		Disguised, Pin, No download from store		?	?
Records video		Siren, launch by shaking option			5000 - 10000
	Yes			No	1000-5000
	Coping tips			Yes, very detailed	1000-5000
			Stages of recovery	Yes	500-1000
Text, audio, video, photos stored in email		Possibility to disguise as weather app		Yes	500-1000
					100000+

that consist of online services and telephone help lines. The availability of locally accessible services varies depending on the region. For example, 19 government funded shelters are located mainly in the bigger cities (Peltonen and Ewalds, 2017). General information on abuse, recovery and available support services is available on the websites of NGOs, governmental agencies, cities and municipalities. Naistenlinja.fi, nettiturvakoti.net and Rikosuhripäivystys (Victim Support Finland, riku.fi) offer additional online services such as private messaging and online chats. Naisten Linja and Rikosuhripäivystys have helplines open for few hours per day. A new government funded telephone service for domestic abuse victims commenced in 2017. The service is called Nollalinja (080 005 005) and it offers support around the clock and on every day of the year. Lastly, the national emergency number 112 is serving in acute emergency situations.

As there were no Finnish mobile based applications dedicated to intimate partner violence situations there was need to explore international options. I searched Play store, App store and Google with English terms. The search resulted with a variety of applications from different English speaking areas. I downloaded and tested some of the applications on iPhone and/or Android phone. Table 2 presents 12 applications and one web-based service and their main features.

Generally, the number of users of applications seem to be modest. LiveSafe is the most popular of the applications. However, it covers safety from a comprehensive perspective instead on focusing specifically on domestic violence. Therefore, it doesn't have any safety

features for usage situations. It is international and offers localized versions and interaction with local stakeholders.

To summarize the findings of benchmarking, several applications offered information on intimate partner violence and different aspects of it. Some apps listed local or national help resources and offered possibility to contact the helplines with the application. Few apps provided the user with the possibility to add personal contacts, and call or SMS them with predefined messages. Couple of services had additional location sharing or tracking options. Several apps offered assessment tools that can be used to help to recognize, name and evaluate the severity of violence. With a couple of applications, it was possible to save various media as evidence. Only one application, Boyfriend log, was called diary. Hence the name, the application is most probably not aimed for violent situations but for reflecting emotions in safer situation. Three dominant features were the sharing of information, various connection features, and user safety aspects.

### 3.3.2 The stakeholders of the potential support

A stakeholder is any individual group or person that may have an impact on the goal of an organization. Stakeholder mapping is a tool that can be used to understand who are the people or groups who influence or can be influenced by an organisation. (Freeman, 1984). In order to understand the potential resources of the survivor, a map covering help and support was compiled. The map is illustrated in Figure 2. The upper part of the figure depicts the services provided by public or third sector. The availability and distance

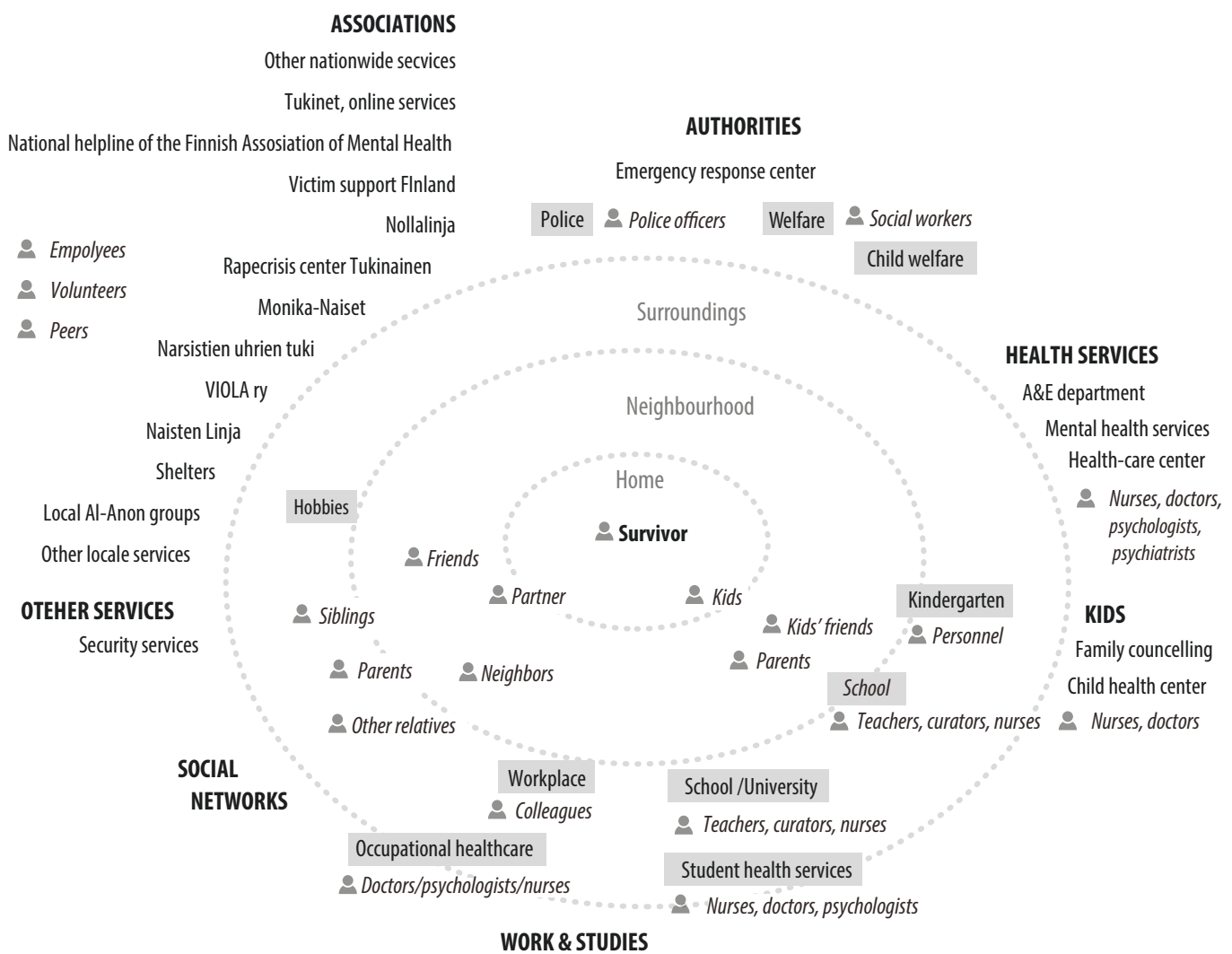


Figure 2: Stakeholder map developed as part of the research for Polku design

of those services may vary regionally. In the lower part of the map there are the resources that are conditional to the individual life situations. The goal of the image was also to perceive the possible parties for co-operation and distribution channels for the application. The stakeholder map indicates that there are a variety of potential supporters on the field. However, the preparedness and capability to confront and help the survivor appropriately

remains unknown. The field of associations is probably the most prepared to provide relevant assistance for the situation of the abused women. The services provided by other organisations may vary regionally and depends on the attitude, capabilities and education of the personnel and organisations. The ability of individuals to offer support depends on their personal readiness.

### 3.3.3 Accessibility and safety of digital devices usage

To gain insights on how women perceive their abilities of using digital services and how they manage privacy and security issues, a survey was conducted in co-operation with Naisten Linja. The target group of the survey was the women who have encountered or were experiencing intimate partner violence. The questionnaire was sent to the volunteer mailing list and the Facebook page of Naisten Linja and to my own social media networks in May 2016.

The survey had 40 respondents. Due to the small sample size the results are indicative. The potential target group was undefined so there is no response rate. Respondents are numbered and referred later in the text (r1-r40). One of the respondents (r16, male (m) 32 years) hasn't encountered IPV and was left out from the statistical analysis. Therefore, the analysis consists of 37 women and 2 men. Youngest respondent was 22 years old and the oldest was 56 years old. The average age was 33,8 years and standard deviation age was 7,5 years. 24 of the responses were from Uusimaa and rest of them came from nine different regional areas of Finland. 31 of the respondents had had encountered violence in their former relationship and 8 in their present relationship.

The survey questions were based on research, expert interviews, discussions and on the knowledge on user experience approach on digital service usage. The survey was conducted in Finnish and the translated questions are in Appendix 1.

The survey examined the perception of respondents on their abilities and knowledge on using computers and smart devices.

Questions 3.5 and 3.6 aim to compare the perception with actual content of the usage. Furthermore, respondents compared their abilities to their impressions on the abilities of their partners. The survey aimed to gain insights on the access to devices and digital services of respondents and whether the services were accessed or misused by the perpetrators. Lastly the survey examines if the respondents would use an application developed for women experiencing partner abuse.

Figure 3 and Figure 4 depicts the access to the Internet with a computer and mobile device, respectively. One of the respondents (r10, female (f), 35) didn't use internet at all. Half (22) of the respondents used computers to which the partner had no access. One fourth (11) of the respondents did not use mobile devices at all in order to access the Internet.

According to Figure 5 during their violent relationships as many as three fourths (32) of the respondents had to either wait for a right moment to use the Internet or could not use the Internet safely when needed.

Respondents considered their ICT skills quite high. 31 (77,5%) evaluated their skills good or excellent on computers, and 32 (80%) on phones. When self-evaluation was compared to questions on different upkeep and safety tasks they were able to perform, the results were mostly convergent, though small dispersion could be detected. Figure 6 shows the self-evaluation of the skills.

When comparing the skills with the access to devices, it seems that if the women consider themselves skilled they feel more secure in accessing internet. This was especially visible if they also felt they were more skilled than

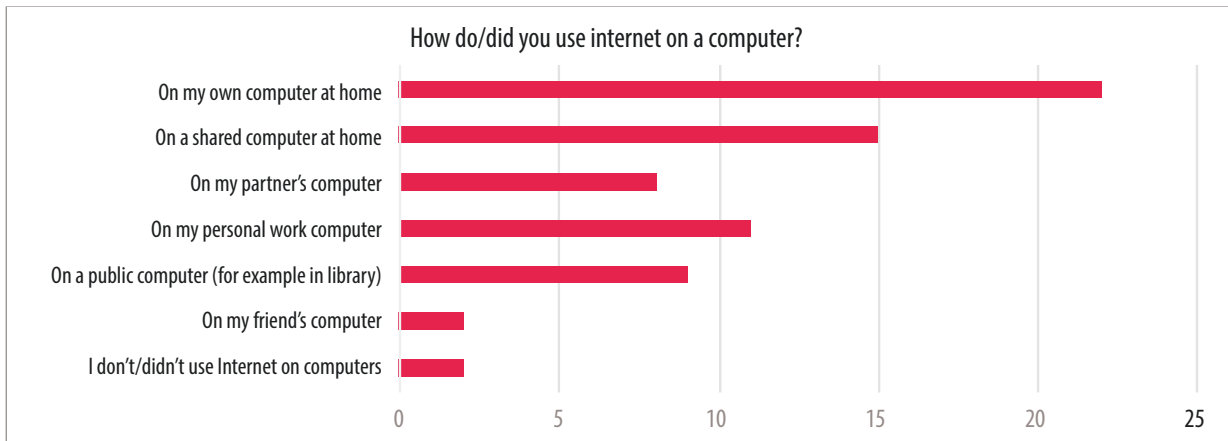


Figure 3: Internet usage on computers

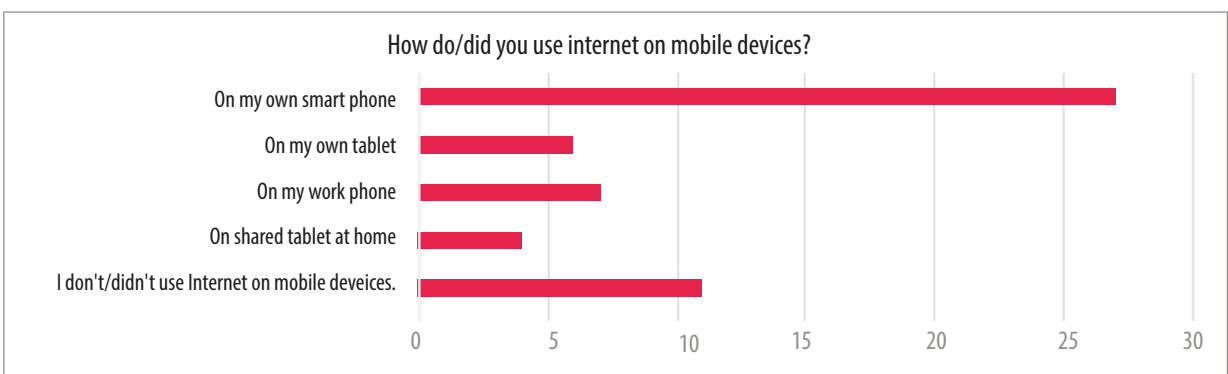


Figure 4: Internet usage on mobile devices

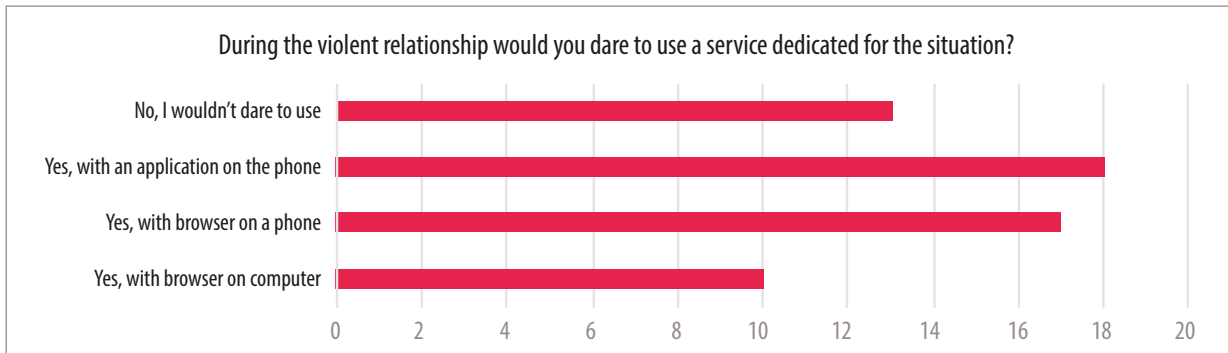


Figure 5: Access to Internet during the violent relationship

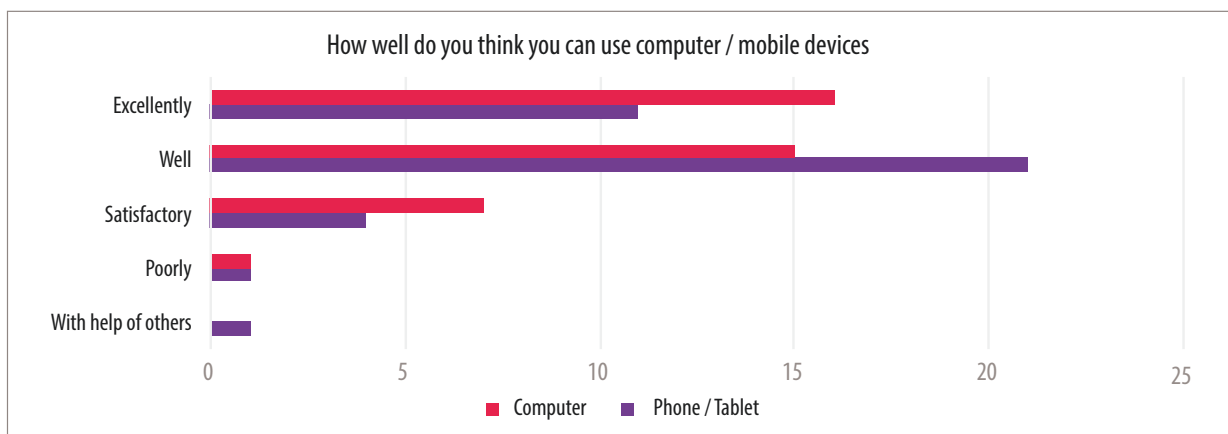


Figure 6: Computer and mobile usage skills

their partners. The skills the women possessed didn't have that effect if they considered their partners to be more skilled. Nevertheless, there were users that had better skills than their partner, but didn't feel safe using the internet. One of them (r 13, f, 34) said in

an open answer that it was useless to change the passwords since getting caught was followed by abuse. She said that new passwords were acquired by threatening, extortion, or violence.

When asked if the abusive partner had ever



Figure 7: Compromised services and content on victims' computers.

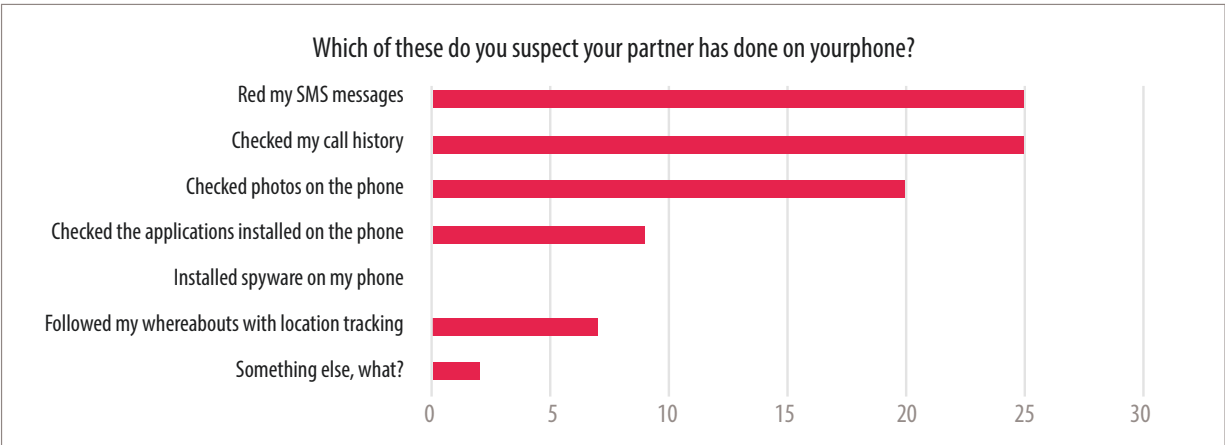


Figure 8: Compromised services and content on victims' phones.

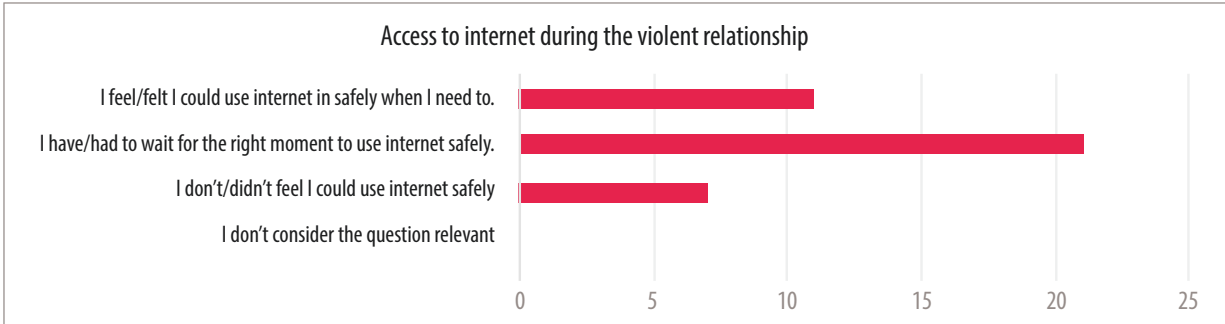


Figure 9: Would you dare to use a service dedicated for the situation?

compromised the computer, only one respondent said that her partner had never accessed her phone or computer. 8 (21%) didn't know and 14 (37%) said their devices were spied on often or constantly. Figures 7 and 8 indicate the occurrence and the means the devices were compromised with. In open questions the respondents reported additional means of spying, such as changing passwords, Facebook stalking, remote control of desktop and spying contacts.

Finally, the survey asked if the respondents would use an application dedicated to abuse situations. The answers are depicted in the Figure 9. The image shows that phone is considered safer device to use in threatening situation, and an application slightly better than browser based solution.

### 3.4 Phase II: Definition and envisioning

#### 3.4.1 Personas and scenarios

Personas is a design method commonly used to understand and describe the needs and requirements of users. Using personas increase empathy for the user and focus on their foremost needs. Personas also help communication between the design team. (Putnam et al., 2009, Massanari, 2010)

Initially, four personas of different age, situations and recovery stages were developed for Polku. Eventually the design project continued with just two of them. The personas were based on the information on the potential users that was gathered in the research process.

To further examine the situation of the users and their possible application usage, scenario stories of Minna and Nea were written (Table 3). Scenarios explored the possible

ways, in which the users might find and start to use Polku and utilize its diary functionality and other features. The scenarios can be read in Appendix 2.

### 3.5 Phase III: Developing the concept

After the research phases, it was time to brainstorm and develop the ideas based on the findings. After the main features were sketched and wire frames created, the first prototype was developed and tested. Usability testing aimed to evaluate the choices on the feasibility of the features, structure, content, and navigation of the application.

Four Naisten Linja volunteers participated in usability tests. The participants hadn't been involved in the project earlier. The individual test events occurred in Naisten Linja office. Usability test approach was the task based talk-aloud method in which the participants are asked to describe what they see and think while they perform the tasks given to them. In Figure 10 one of the testers is using the prototype.

Participants answered a short questionnaire (Appendix 3) before and after the test situation. Before the test, the participants answered couple of background questions and evaluated their preconceptions about the effectiveness and safety of the application. After the usability test the participants evaluated their perception on the effectiveness of different features, and the safety of the prototype.

Sampling was very small in the test and in the questionnaire, but it gave some insights for the further development. Based on the answers, the safety features of Polku increased the perception of safety, whereas the perception of effectivity declined. Out of the different features of the application the diary, contact-



	 <p style="text-align: center;"><b>Nea</b> Friendly and adaptive student</p>	 <p style="text-align: center;"><b>Minna</b> Self-sacrificing mother hen</p>
<b>Demography</b>	21-year-old student, lives in a bigger city with university.	36-year-old working mother of one child, re-married, lives in a city of 50 000 inhabitants.
<b>Personality</b>	Kind, adapting and social, but a little shy. She want's things to go smoothly and doesn't want to make a scene.	Passionate, loud and motherly. She has been the one taking responsibility of herself and others from an early age.
<b>Relationship</b>	One year in relationship, just moved in together. Partner is a few years older.	Five-year relationship, one child together, one from partner's earlier relationship, all live together.
<b>Situation</b>	This is Nea's first 'serious' relationship. After a lovely beginning, her partner is becoming jealous, restrictive and unpredictable. He wants to know where Nea is, and has asked to see her texts and emails. He explains his doings by saying that she loves Nea so much. Nea feels that she loves him too and tries to please him and adapt to his rules and behaviour. The situation has escalated after she moved into his house. She has started to feel depressed and sometimes she feels fearful at home.	Minna's spouse is aggressive when drunk, attacks Minna by holding, pushing, and dragging her around. He breaks things when aggressive. Physical violence has continued infrequently from the beginning of the relationship. Minna blames herself for the violence, because she's lost her temper and yelled at him. She explains the violence with the difficult childhood of her spouse and tries to "save" him. After the incidents she wants to leave, but when things cool down, she settles and hopes that things whave changed.
<b>Stage of recovery</b>	Contemplation. Nea is committed to relationship, but unhappy. She is confused and ashamed and tries to change herself. She is not looking for help.	Preparation. Minna feels that she is on the edge of her tolerance and she is considering change. She doesn't necessary know what that means, but she starts to question the status quo. She is worried about the well-being of the children. She has called Naisten Linja once.
<b>Technology skills and access</b>	Average skills, has her own computer and a smart phone, partner occasionally accesses the devices	Average skills, owns a smart phone, a shared computer and a tablet, spouse is not technologically skilled, has smashed her phone once.
<b>What she might need</b>	Nea might benefit from information on the forms of violence and its consequences to understand that the behaviour of her partner is not ok, and that it is not her fault.	Minna might benefit from recognizing the cycle of abuse in her life. She might need the information on abuse, but could also benefits from tracking the events. Could collect evidence.

Table 3: User Personas



ing option to Naisten Linja and information on violence got the highest possible ratings, as did the PIN code and fake application. Evidence gathering, positive affirmations and safety planning tool weren't quite that popular. On the scale from 1 to 5 no feature got lower than 3 as a value. Everyone answered positively when asked if they would recommend the application. When asked to whom they would recommend the application, they said they would recommend it on the Naisten Linja help line and for the women who aren't quite sure how serious the abuse is and whether they should leave the relationship. They wouldn't recommend the application for extremely anxious and confused person or to a woman whose partner is controlling her phone. The respondents wished for a stronger

emphasis on reaffirming that the victim is not guilty of her situation, and encouragement to speak up. The app was said to be a good addition to human contact. Based on the test results and the feedback of the participants the design went through quite drastic changes in the structure and layout of the app, but the main functionalities stayed the same. Some additional features were removed.

### 3.6 Phase IV: Delivery

The initial aim of the project was to deliver plans and a road map for development of an actual application. Due to the small resources the deliverable remained on the concept level suggesting what a product such as Polku could offer for the users. Polku concept is further discussed in the chapter four.

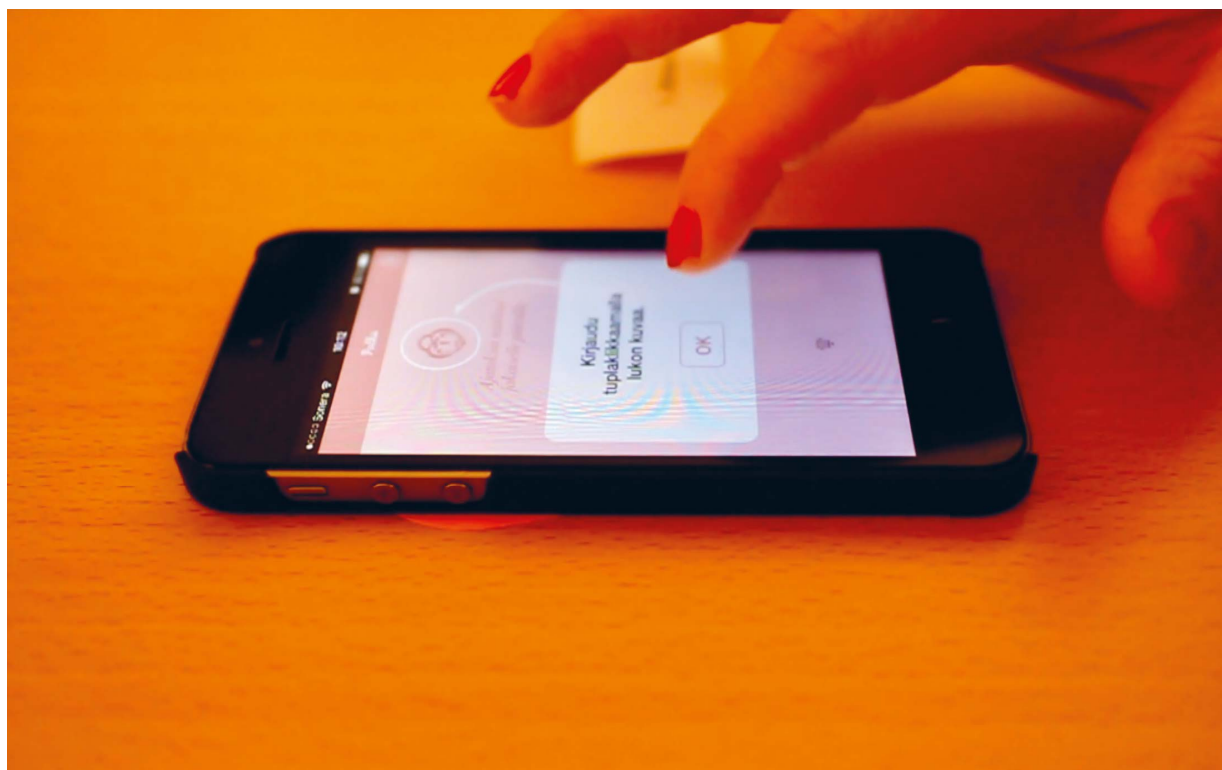


Figure 10: Usability testing

## 3.7 The highlights of research results

### The insights from the interviews

- Recovery is an individual and unique process to each survivor.
- Abused women undermine their experience of abuse and interpret the situation for the better.
- Recognizing and naming the abuse is essential on the path of recovery.
- It is important for the survivors to understand that their reactions to violence are normal, and a sign of being mistreated. Support and safe environment is needed when going through difficult emotions.
- Seeking help takes a lot of effort and failed attempts can be regressive experiences.
- Traumatized victims are in danger to become marginalised and excluded from work life.
- There is an emotional risk in use of diary application alone. Time after separation is especially vulnerable.
- Potential application should take privacy and security seriously.
- An application should help women to recognize their own resources and opportunities.
- Application should have compassionate tone of voice and a limited number of features.
- Personal experiences stored in an application could help the women to remember and communicate the situation to others.
- Users of an application could benefit from information on the forms of violence and on safety planning.
- For some severe situations, any mobile application can be too complicated or hazardous.

### The insights from the survey

- Half (22) of the respondents used computers to which the partner had no access.
- One fourth (11) of the respondents did not use mobile devices at all in order to access the Internet.
- During their violent relationships three fourths (32) of the respondents had to either wait for a right moment to use the Internet or could not use the Internet safely when needed.
- Among the respondents the ICT skills were considered quite high and the skills correlated with different upkeep and safety tasks measured.
- If the women considered themselves skilled in ICT and more skilled than their partners they felt more secure when accessing internet.
- The devices of 14 (37%) respondents were spied on often or constantly.
- One respondent said it was useless to change the passwords since getting caught was followed by abuse. New passwords were acquired by threatening, extortion or violence.
- Phone was considered a safer device to use in threatening situation and an application slightly better than a browser based solution.

### The insights from benchmarking

- There are web-based services available in Finnish for abuse victims but no dedicated mobile applications.
- Most common features of available English mobile applications are information on abuse, communications tools and safety and privacy tools.

### The insights from usability testing

- Impression of safety increased during prototyping but the perception of effectiveness declined.
- Most preferred features were the diary, contact to Naisten Linja and information on abuse along the safety features such as hidden application and PIN protection.
- Participants said they would recommend the usage of application to women experiencing abuse, but not if they would be in very exhausting and dangerous situation.



## 4 POLKU - SUPPORTIVE MOBILE APPLICATION CONCEPT

This chapter presents the concept of an application intended as a tool for women experiencing intimate partner violence. The application is called Polku (Path in English). The aim of Polku is to offer women tools to recognise and name their experiences of abuse, and support the survivors on their journey to recovery. To achieve this goal Polku offers information on the forms and recovery of abuse, a secure connection to Naisten Linja services, and a tool to make diary notes and follow moods. The solutions of Polku are based on the theoretical framework, design research, usability testing, and on the feedback from Naisten Linja employees.

## 4.1 Polku features

A *diary entry* can be made from the home screen of Polku (Figure 11). In the diary user can choose one of the three emoticons indicating joyful, neutral or melancholic feelings. User can add media such as a text, photos or recordings and follow places, people, or the keywords of her choice (Figure 12).

Users can use diary function *to collect evidence*. Media storage of Polku can be used to

store documentation of indications of abuse, such as photos of injuries or broken furniture, and screen captures of intimidating messages. Content will be saved with the date and the additional information that user chooses to store. In Polku, each entry is possible to hide from the phone, in which case the content would only be possible to view from the web browser.

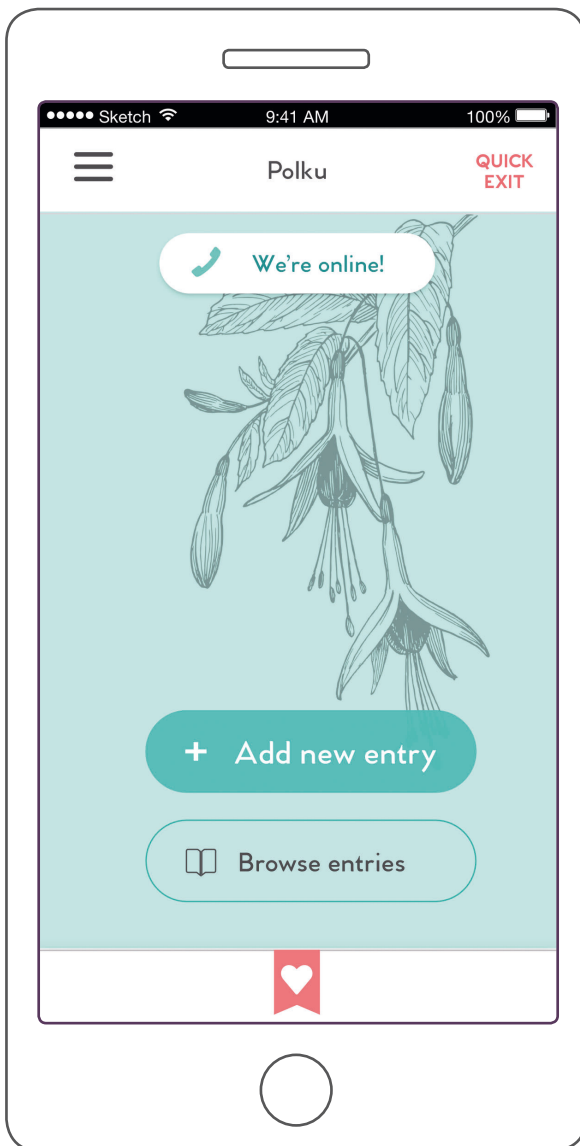


Figure 11: Polku front page

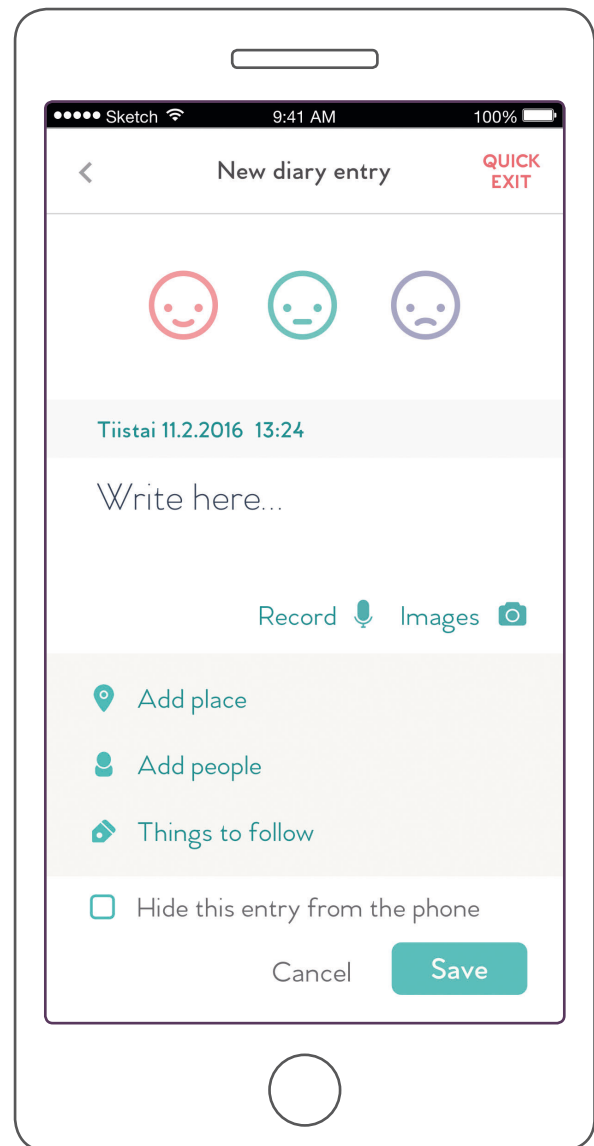


Figure 12: Polku diary entry

After each entry and the chosen happy or sad face, the application reacts to the choice. After a positive entry (Figure 13) user can save the entry as a positive resource if she wants, and after the “sad” entry (Figure 14) she is asked if she wants to see some options of things to do.

It is possible to for example view the resources the user has stored for difficult situations. This feature is optional and can be turned off. The aim is not to sooth the negative feelings away, but to find actions that could improve the current situation.

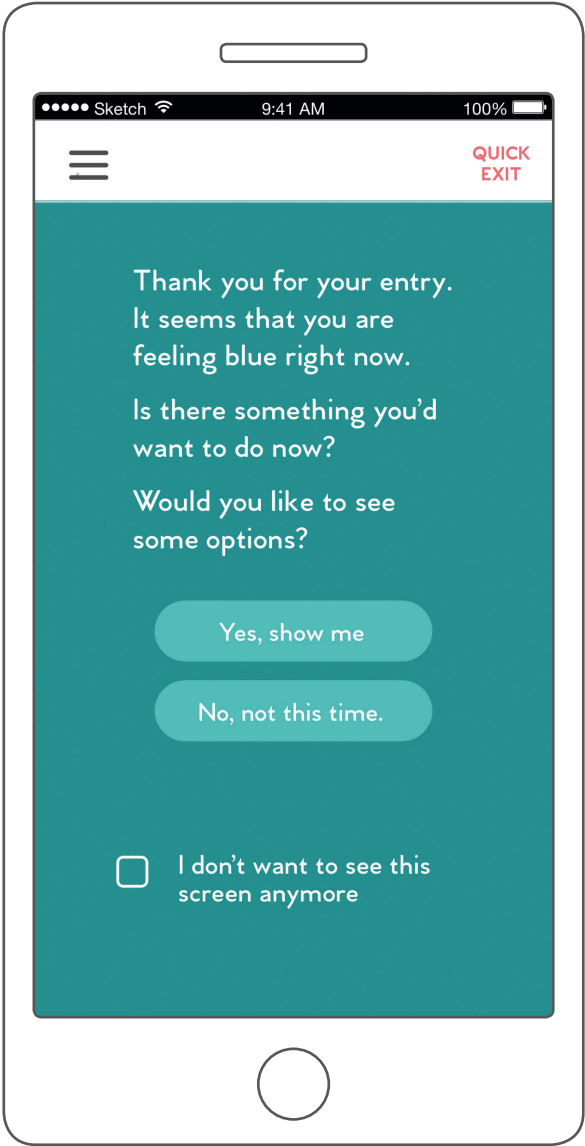


Figure 13: Screen after positive entry

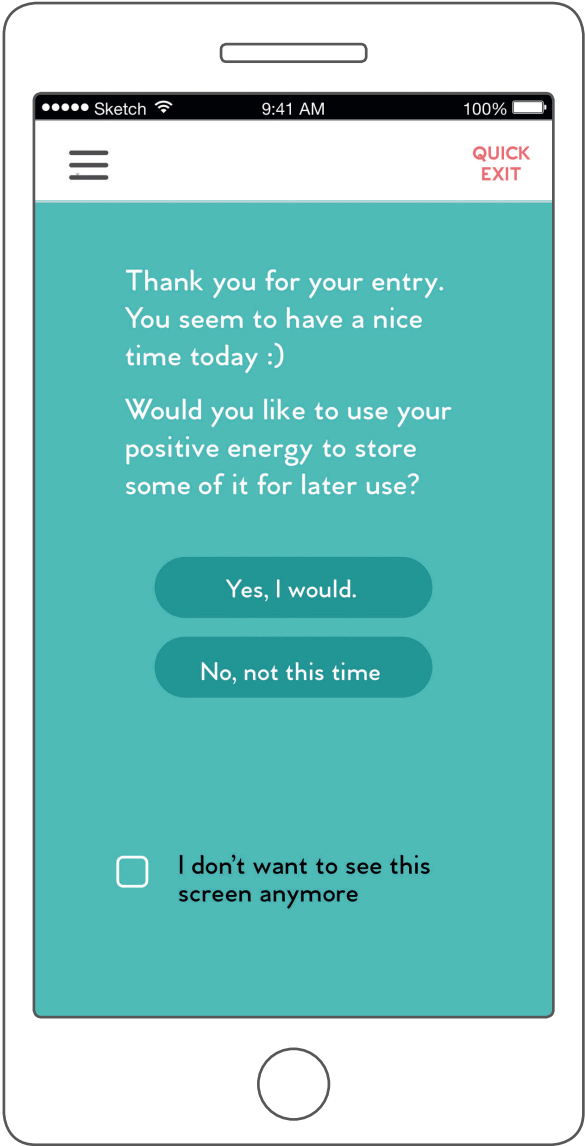


Figure 14: Screen after negative entry

The diary entries have two choices for viewing: the calendar view (Figure 15) and the list view (Figure 16). In the calendar view the dates are colour-coded according to the moods. The user can also view the frequency of the keywords she is tracking.

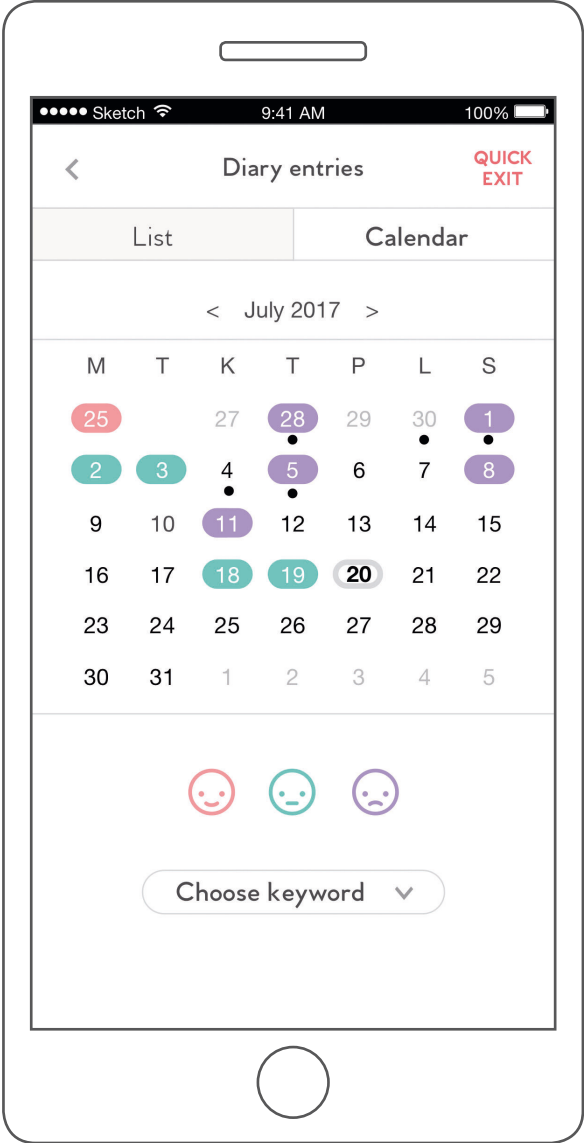


Figure 15: Calendar view

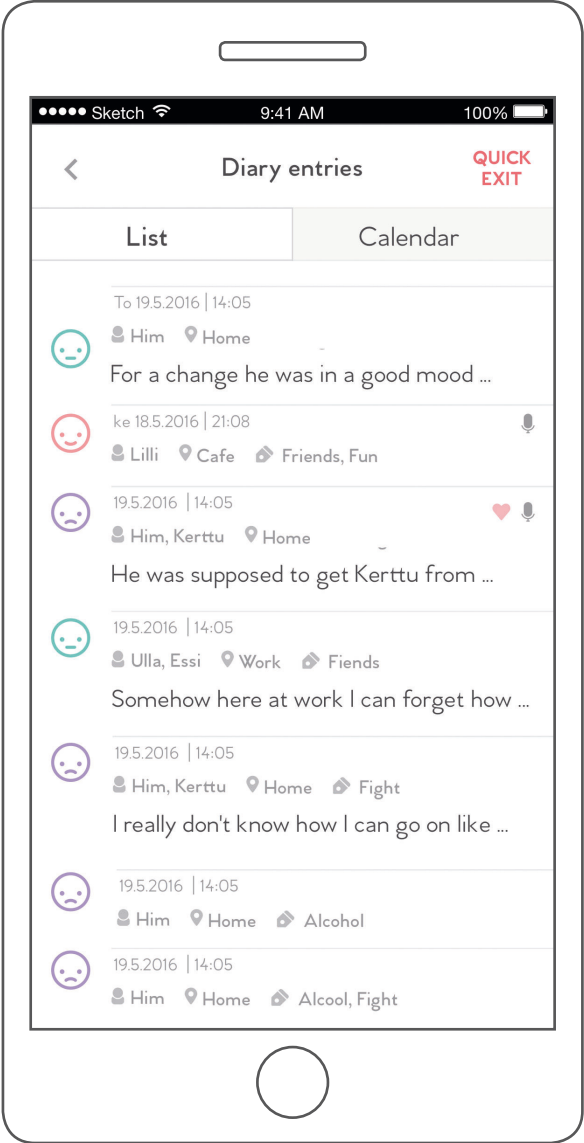


Figure 16: Entry list view



Polku offers *Safety planning* for the users to evaluate their safety situation, and prepare them for possible threatening situations. In the safety planning section (Figure 17) user can either go straight to filling up the safety features or answer first a few background questions on her situation. The questions ask for example if she has kids or if she is living together with her partner. According to the

answers the safety planning tool adapts to her personal needs. In addition to the common safety planning tools, the digital safety planning goes through different aspects of privacy and safety issues related to the usage of devices, social media and other online tools. Safety planning prepares users for the emergency situations. (Figure 18).



Figure 17: Safety planning menu

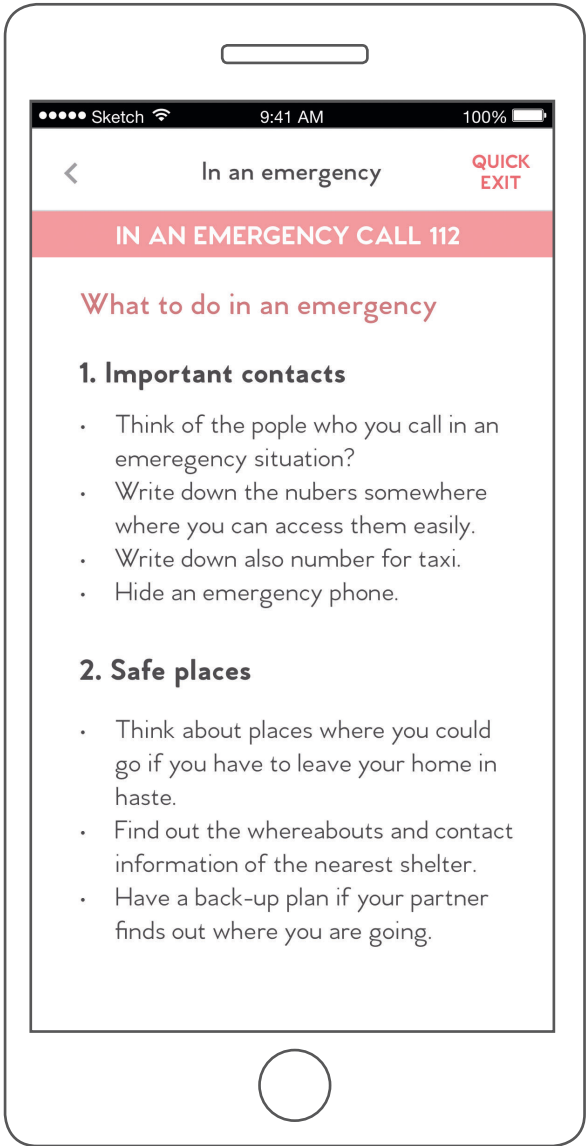


Figure 18: Safety planning

**Survivor’s handbook** (Figure 19) consists of information and resources on domestic violence and how to recognize it. In this section users can find sources of help and support and find information on recovery.

My resources is a section for users to map out and store their own resources. It is the place where they can save their thoughts, memories or positive affirmations and find those whenever needed.

**Positive affirmations** are positive thoughts, facts and little notes of support. The texts are collected from other survivors, and they can be stories of survivors, poems, lyrics, quotes, and anything that has been helpful for someone who has lived through a similar situation. The tool can be opened from the bottom of the home page and the content can be saved as a diary entry or added to the positive resources. (Figure 20)

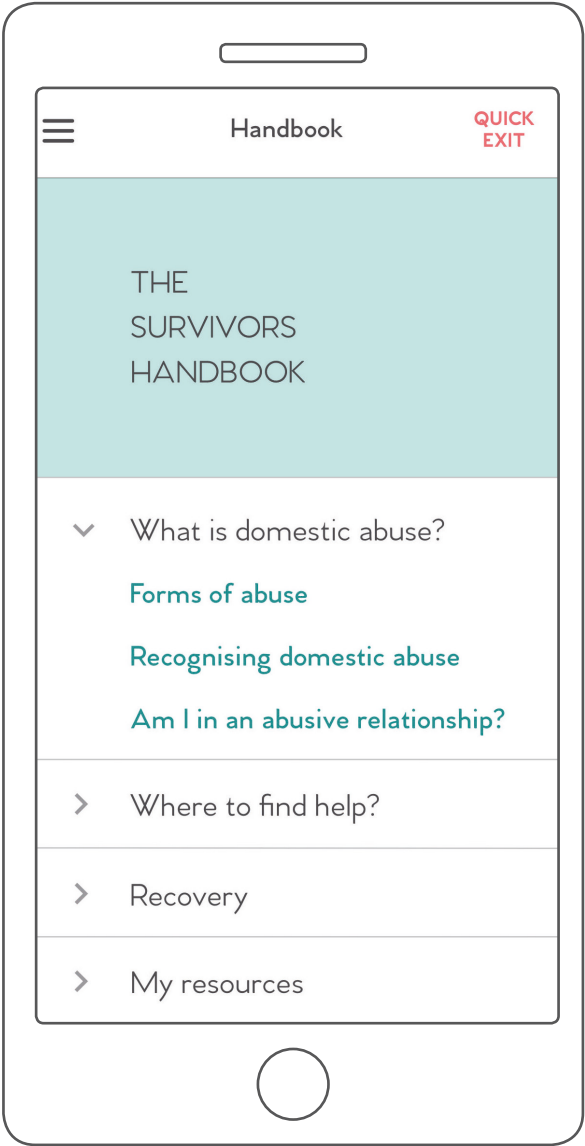


Figure 19: Survivor’s handbook menu

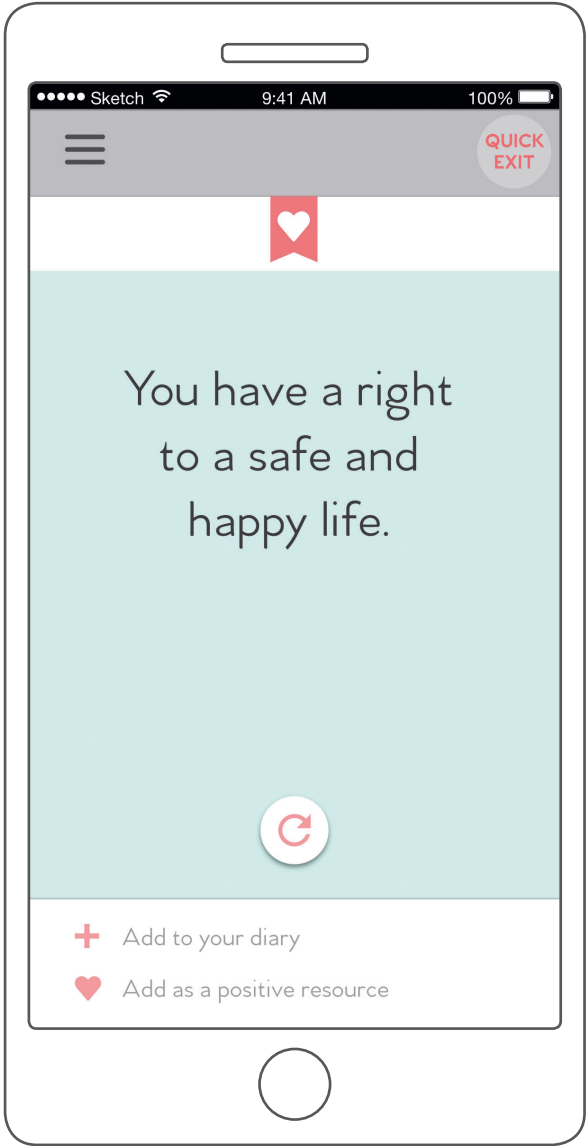


Figure 20: Screen of positive affirmations

**Secure calling** (Figure 21) lets the user contact Naisten Linja without leaving traces to the call history of the phone. From the same view, it is also possible to send anonymous messages. To inform the users of the availability of the help line, an indicator of the line being accessible is shown on the front page of the application during the call hours. This can be seen on the Figure 11.

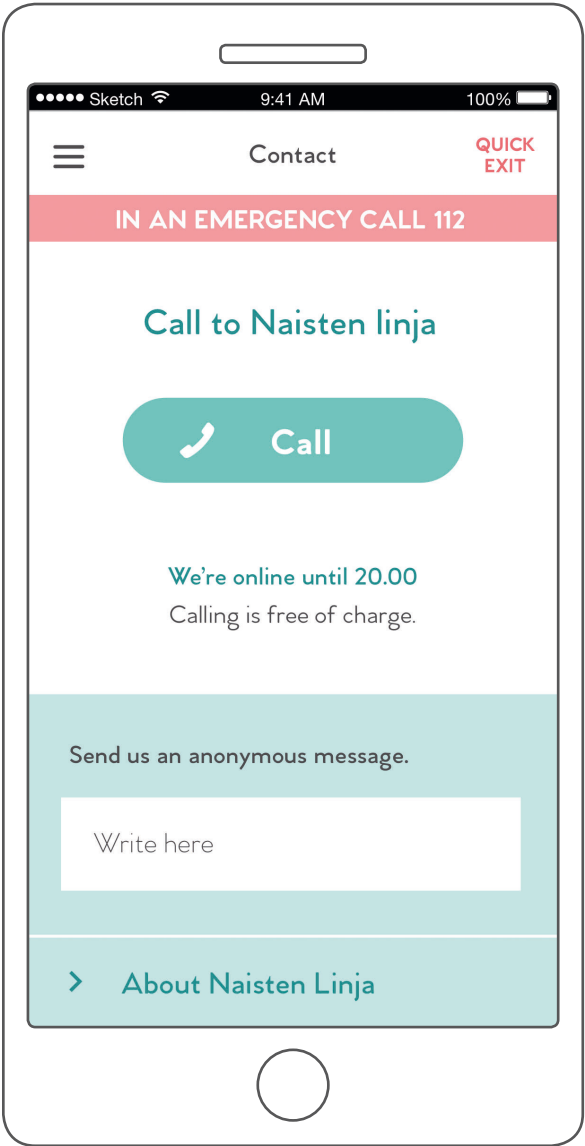


Figure 21: Secure contact to Naisten Linja

## 4.2 Safety solutions in Polku

**Fake application** aims to hide the true purpose of Polku. After the app's opening and onboarding, the first screen of Polku looks like a simple app showing daily aphorisms. (Figure 23) Basic functions of the fake application allow user to either skip or favourite aphorisms and browse the favourites. The sign in link is “hidden in the plain sight” as an



Figure 23: "Fake" aphorism application

image that doesn't directly indicate accessing the password screen. The image button needs to be held longer for the sign-in function to activate. This aims to avoid the opening of the screen if the view is randomly clicked.

The aphorism application was chosen on the assumption that it would seem harmless, and it wouldn't raise suspicion nor induce further investigation. Another benefit of aphorisms is that they serve as an additional way to offer supportive content for the users. The feedback on the feature from users and client was positive. From the resource side the aphorism feature is also quite simple to implement and therefore affordable.

Fake application keeps Polku hidden as long as the perpetrator who has access to phone isn't aware of the content. All available information and awareness campaigns could potentially compromise the secret. Though some information should be available for example in the case of a user forgetting how to open the application.

PIN code protection was chosen for Polku because it is commonly used and easy to adopt. PIN code is also fast to set and effort-

less to enter when opening the application. The PIN code of Polku is set by the user during the first time of use and there is no possibility to access the secure part of the application without the code. Securing the access could provide the users feeling of having a bit more privacy and security.

Quick exit is a common feature in digital services for abuse victims and it is also available in Polku. The "panic button" of Polku signs the user out of the secure part of the application and opens the "fake" aphorism view. The button is visible in the right top corner on every screen in Polku. This feature is needed in case the perpetrator suddenly appears in the usage situation of the application and the user needs to hide the content quickly.

The first usage of application is called onboarding. The main purpose of the onboarding process of Polku is to communicate the security procedures such as setting up the personal PIN code and signing in with the fake application. Onboarding was tested in the usability test and the proceedings mentioned above were quite well adopted.





## 5 RESEARCH CONTRIBUTION: DESIGN PRINCIPLES

This chapter proposes design principles aimed to offer guidance for working in design in the context of inmate partner violence. Principles are formed based on the the highlights of the theoretical framework (chapter 2.4. page 33) and the highlights of research results (chapter 3.7 page 50). The principles were used and further developed during the design process of the Polku concept.

As the result of the process three main topics of design principles emerged: 1) safety and privacy, 2) validation and support for empowerment and 3) encouragement to reach out. Principles do not offer directly implementable detailed solutions, but provide aspects that can be taken into account in planning, and during and after design. The presentation of principles includes references to the literature, the empirical research results of this thesis, and the features of the Polku concept.

## 5.1 Principle I: Safety and privacy

### **Safety by design - Incorporating safety in the design process**

The users of IPV online services are in danger of confronting physical and/or mental violence and stalking in both digital and physical realms of their lives. The aim for the safety of users should be the guiding principle in all phases of the design process: in the planning, design, and development processes, in the features and content of a service, as well in the in the outcome, marketing and utilization situations. Safety by design is, in a sense, an umbrella term promoting the idea of incorporating safety aspects to all stages of design process.

### **Safety of the volunteers and participants**

In case the women currently under the threat of abuse are co-operating in the development process, their safety should be take into account. The process needs to be open as well as informative, and the participants should know what is happening and what is expected of them. The communication with the participants should be handled on their terms avoiding any risks. Anonymous participation is a good choice when possible. Collected data should be treated appropriately, and the stories participants share should not be recognized.

### **Safety of the designer**

When designers are working publicly with intimate partner violence projects, it might be wise to consider the safety and privacy of them as well. Designers are usually working outside the scope of media attention, but online harassment can be just one blog-

post away. It is known that the perpetrators are posing a threat not just to their primary victims, but also for the people trying to help them. For example, the employees working for domestic violence advocacies have security classification for their personal information. Checking and restricting the accessibility to personal information such as a home address can be enough.

### **Design for anonymity**

Aside the potential threat of violence, the stigma of abuse, guilt and shame are blockers for searching help. Anonymity lowers the threshold to access and use services. Possible data collections should be handled with care and transparency. User data is controversial in these kinds of applications. Users should be able to trust the application provider with personal information whereas developers need the user data to improve the product. Polku concept is in an early stage and does not take a stand on the data handling, but the usage was designed to be anonymous for the users at any point of use.

### **Design for easy security**

Using security controls of services should be easy and intuitive for the users. The defaults of safety features should always be set on the safest and the most private modes. The consequences of the choices users make should be understandable. Possibilities of easy removal or hiding sensitive data is recommended. In the Polku concept user can delete any data she has stored; the purpose of application is hidden by default and the content is protected with PIN code.



### **Prepare for the safety of devices and the usage situations**

According to the survey, devices of 14 (37%) respondents were spied on often or constantly, and during their violent relationships three fourths (32) of the respondents had to either wait for a right moment to use the Internet or could not use the Internet safely when needed. The risk of devices getting in the hands of the perpetrators creates a need to ensure that the purpose, content and access to services can be hidden or doesn't seem suspicious. Additionally, the content should be quickly hidden or easily removed. Push notifications can be revealing and should be either disguised or avoided. Different usage situations has been taken into account in Polku by providing a possibility for quick exit from the application on every screen and hiding the purpose of the application behind a fake view and functionalities.

### **Develop safe systems and data protection**

Providing the feeling of safety for the users is not enough, the promises need to be redeemed. According to Luxton et al. (2011) a tight control of software quality and personal data management is crucial. The development should be ordered from reliable service providers that preferably have history of working with medical information or other highly private data.

### **Provide information on safety and privacy**

Research and interviews indicated the need to educate users on safety issues and give instructions to enhance their safety. The online safety assessment tools are proved to be effective. Furthermore, it is necessary to provide infor-

mation on online safety. In Polku concept the safety planning tool offers users tools and information on physical and digital safety.

### **Inform users about the risks of application usage**

However well designed the digital services and their safety features are, there will always be users that cannot take the risk of using the tools. People who are confronting abuse can best evaluate their safety situation. However, it is recommended to remind the potential users of the possible safety risks that for example downloading an application might pose. Benchmarking indicated that many of the current application providers have taken this into account and provide security notes on application download pages.

### **Emotional safety**

The risks for emotional safety can rise from the difficult emotions that experiencing abuse causes. Especially in the interviews the participants raised concerns with the possible negative consequences of experiencing difficult emotions alone. Applications with features associated with self-reflection could work best as complementing utilities for services based on interaction with professionals. The concern with emotional safety changed the focus of diary in Polku from delving into feelings towards describing the event.

## 5.2 Principle II: Validation and support for empowerment

### **Involve the users and experts in the process**

Warshaw (2013) and (McClennen (2010) discuss the complexity of the problems that IPV victims are dealing with, and the need for proper training and resources for the supportive personnel. IPV related design projects would benefit from multidisciplinary teams and user involvement. Especially with therapeutic approach, close cooperation with the experts on therapeutic frameworks is essential. In an ideal case a team of versatile professionals would work in participatory design project to create the services. The design of Polku benefitted from the wide variety of perspectives that were acquired from professionals, volunteers and survivors.

### **Design for individual needs**

Recovery is a process and the phases are non-linear with victims going back and forth between different phases (Moss et al. 1997; Frasier et al., 2001; Smith 2003). Therefore, customers of the services can be in very different stages of recovery and their needs for information and their ability to digest and benefit from it are different. Language, social background, family and safety situations vary as well. Polku provides a personalized safety planning tool and comprehensive information on various topics on domestic abuse aiming to provide relevant knowledge for various situations.

### **Design easy-to-use products**

Like in any other application or service, simple and straight forward usage experiences raise the probability of satisfying user experience. Applications that are targeted for users struggling with trauma and its consequences should lean on familiar usage patterns and connotations in features and functionalities. Usability tests provide essential insights on the user flow and should be pursued to test and improve the user experience of the service. Even a modestly sized group of testers can be beneficial as it was in Polku case. After the usability tests, some of the main functionalities such as adding diary entry were redesigned for better usability.

### **Naming and validation of the experience of abuse**

The interviews emphasized the importance of validation and naming of the experiences of women experiencing abuse. Documented and stored experiences of abuse can help to identify the abusive behavior. (Break the cycle, 2014; Domesticshelters.org, 2015; Loveisrespect.org, 2017). Naming the experience can be supported for example by providing information or questionnaires that name the actions of abuse and state what kind of behavior need not to be accepted. Writing done notes and events in journal help the abused to remember what has happened and reconstruct a bigger picture. Validation can be supported with the content and messages explaining that the negative emotions the abused might feel are normal reactions to violence.

### **Design for accessibility**

Anyone can experience intimate partner violence. The potential users of services represent all walks of life with different ages, languages, locations, possibly disabilities or special needs. Users can be facing obstacles in availability of technologies, devices or they might be lacking necessary skills. When designing services aiming to reach and support broad user base it is recommended to use available online resources, toolkits or such to aid in developing and testing systems for comprehensive accessibility.

### **5.3 Principle III: Breaking the silence**

The third principle encourages to provide knowledge and means to reach out and break the silence. Shame, guilt and the fear of social stigma are strong barriers for the victims to share their situation, and it is important to help victims establish connections to other people. To enhance connections Wilson et al. (2005) emphasize the need to back the social relationships of the survivors with their friends and family, advocates, and other survivors.

### **In the emergency**

The services should always state the local emergency number as a primary source of help in a case of emergency. This is a common practice among aid providers. When providing further information on safety assessment tools, the preparation for the emergency situation is worth addressing profoundly. In Polku this is provided as part of the safety assessment tool. The tool walks user through

the common preparations for the emergency situations such as having important contact information and a bag packed ready, having someone trusted person easily alarmed and reminding about emergency number.

### **Information and connections to support services**

It is important to make users aware of the resources of support and encourage them to tell somebody about the abuse. It depends on the resources of the user whether she approaches friends, family or service providers. Anonymous contact options might lower the threshold, and such contacts can be provided with communication technology. Polku offers users a possibility to call or send anonymous messages to Naisten Linja. In addition, the information section provides contact details to other supporting services such as shelters.

### **Peer support**

Peer support is an effective method during the recovery process. Providing an online service with peers could at the minimum be sharing survival stories. The service could include interactivity in forms of chats or forums, though the need of moderation consumes resources. Open conversation tools include risk of unwanted interference from inappropriate people. Persistent abusers are known to find their way into services by pretending to be someone else. The voices of other survivors are heard in Polku with positive affirmations, thoughts, facts and little notes of support collected from them.



## 6 CONCLUSION

The primary purpose of the current study was to explore challenges of designing digital services, and mobile services in particular, for women experiencing intimate partner violence. The goal of the thesis was to format suggestions on how to approach and overcome those issues. In addition, the aim of the thesis was to explore the user needs and opportunities, and create and test a concept of a mobile application. The thesis hypothesized that some of the safety and privacy issues could be avoided or minimized and that beneficial usage opportunities could be found.

The thesis explored literature on intimate partner violence and ICT, aiming to understand the recovery process, interventions and safety environment of abused women. The design process focused on finding the features, content and security solutions that are beneficial when providing information and other support safely to women experiencing IPV. The research included preliminary desktop study, interviews, survey, and a design project. The design process was conducted with people working or volunteering to support the victims. Some of them had experienced violence themselves. The process resulted in the concept of a mobile application and the suggestion for design principles. The three main principles that emerged to support design process for women experiencing IPV were 1) safety and privacy, 2) validation and support for empowerment and 3) encouragement to reaching out.

The findings indicate that there are opportunities for mobile services amongst the target audience surviving intimate partner violence. Interviews, survey answers and usability tests imply that tools such as Polku could provide relevant support for women experiencing IPV. However, the risk of imminent violence needs to be considered in the solutions. The outcomes of this research suggest that risks can be reduced. Comprehensive safety is not a realistic goal, but with precautions such as PIN codes, hidden applications and instructions the safety of usage can be improved.

This design process concentrated on reducing safety risks and developing practical tools and therefore it lacked analysis of the development and maintenance costs. Evaluating the balance between benefits and costs of different solutions is an essential step in further development. Additionally, the employee side and the tools for maintaining and updating the application needs to be a part of further investigation. Usability testing in this project was based on low-tech prototyping with limited access to primary users hence the validation of the effectiveness and impact of the features needs further examination.



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## Survey questions

### Background information

age  
region  
gender

### Have you experienced mental or physical violence in an intimate relationship?

Yes / No

### Access to information technology and Internet

#### How do you use/used Internet on a computer?

On my own computer at home  
On a shared computer at home  
On my partner's computer  
On my personal work computer  
On a public computer (for example in a library)  
On my friend's computer  
I don't/didn't use Internet on computers

#### How do you use/used Internet on mobile device?

On my own smart phone  
On my own tablet  
On my work phone  
On a shared tablet at home  
I don't/didn't use Internet on mobile devices

### Access to Internet during the violent relationship

I feel/felt I could use internet safely when I need to.  
I have/had to wait for the right moment to use internet safely.  
I don't/didn't feel I could use internet safely  
I don't consider the question relevant

### Information technology skills

#### How well do you think you can/could use computer?

With the help of others  
Poorly  
Satisfactorily  
Well  
Excellently

#### How well do you think you can/could use a smart phone or a tablet?

With the help of others  
Poorly  
Satisfactorily  
Well  
Excellently

### Who helps/helped you with information technology related problems?

I can/could usually solve problems myself  
My partner  
Friend  
My child  
Colleague  
No one  
Search engine (for example Google)  
Someone else, who?

### Would you consider yourself or your partner more skilled on information technology?

My partner is/was significantly more skilled  
My partner is/was somewhat more skilled  
We are/were equally skilled  
I am/was somewhat more skilled  
I am/was significantly more skilled

### Which of these procedures you can do on a computer?

Installing a program on a computer  
Uninstalling a program from a computer  
Emptying the browser history  
Using private browsing  
Changing my user password  
Using virus detector  
Using firewall

### Which of these procedures you can/could do on your phone?

Emptying browser history and search history  
Installing an application  
Uninstalling an application  
Shutting down location tracing  
Deleting SMS messages  
Removal of photos and other files  
Changing PIN-code  
Changing safety settings of the phone  
Resetting the phone  
Shutting down Bluetooth connection

### Do/did you use automatic backup on your phone? (Apple iCloud, Android backup)

Yes / No / I don't know

### Safety and privacy

### Do/did you have a password protection on your computer?

Yes / No

**Are/Were your mobile devices protected by password?**

Yes / No

**Who has/had access to your computer?**

My partner  
My child  
Friends  
No one  
Someone else, who?

**Does/Did anyone know your user name and password to your devices and services?**

Yes / No / I don't know  
(If the answer was yes)

**On which services or devices?**

Computer  
Mobile device  
Internet banking  
E-mail  
Social media (for example Facebook)  
Something else, what?

**Who knows/knew the access information?**

My partner  
My child  
Friend  
Personal assistant  
Someone else, who?

**Have you been pressured to give your password?**

Yes / No  
More information [text field]

**How often your partner has searched or followed your private information on your computer or phone?**

Never, as far as I know  
Once or a few times  
Often  
Constantly  
I don't know

**Which of these do you suspect your partner has done on your computer?**

Read my e-mails  
Checked my browser history  
Spied on my files on computer  
Installed spyware on my computer  
Something else, what?

**Which of these do you suspect your partner has done on your computer?**

Read my SMS messages  
Checked my call history  
Checked photos on the phone  
Checked the applications installed on the phone  
Followed my whereabouts with location tracking  
Something else, what?

**Do/Did you suspect that your partner has checked your private messages on social media services like Facebook or WhatsApp?**

Yes / No

**When or where do/did you feel unsafe to use the Internet?**

At home  
At work  
When accompanied by my partner  
At my friend's place  
Somewhere else, where?

**During the violent relationship would you have dared to use a service dedicated for the situation?**

Yes, with browser on computer

Yes, with the browser on a phone  
Yes, with and application on the phone  
No, I wouldn't have dared to use

**Anything else to comment?**

## Persona scenarios

### Nea's story

Nea is reading a magazine in dentist's waiting room. The magazine has an article on psychological abuse in relationships. Nea finds some uncomfortable similarities to her own situation. Aside the survivor stories, the article has some recommendations on what to do, if someone is suspecting psychological abuse. One tip is to keep a diary, and the article suggests an application that could be suitable for the situation. Nea is a bit hesitant, and wonders whether she really need the application, but nevertheless follows the link to the download page and downloads Polku.

After her dentist's appointment she gets a bus and remembers the app. She opens it and pleased to learn there is PIN and that the application is hidden. Her boyfriend has read messages on her phone, so it's good that the application doesn't look suspicious. After the intro, she skims through the features on Polku and ends up reading the information on violence. She recognizes again her feelings from the description of being mentally abused. She decides to start making notes of her daily experiences and feelings.

She goes to the diary and makes her first entry. She is actually feeling a bit hopeful that there might be an explanation to her mixed feelings, so she chooses the most positive option out of three. She writes few words about her whereabouts and is a bit amused to start a diary. The last time she did so was in the elementary school. She snaps a photo out of the buss window. When saving the photo, she is prompted a tip saying it could be useful to take a screen capture

of abusive messages if she ever receives any. She doesn't think too much of it and saves her first entry.

The next time Nea comes back to the application she reads more about the tips on how to use the app. Her boyfriend has been quite controlling lately and has sent her tons of messages. Nea is thinking about maybe starting to save those, too. Especially the ones where her boyfriend is accusing her of cheating and calling her with nasty names. Nea starts to keep the diary occasionally.

Nea's feelings are going up and down. After one very bad evening, on adding an entry in Polku she notices that the support line of Naisten Linja is open. She is home alone and decides to call. She learns about open evening meetings in Naisten Linja and after some time she decides to take part.

After a while Nea tells about her situation to her close friend. The friend supports Nea in meeting a psychologist through student healthcare. Slowly, with the support of professionals and friends Nea is encouraged to tell her boyfriend she doesn't want to be with him and moves out of their apartment. He doesn't take it well and starts following and sending her messages constantly. He is threatening her, and she starts to feel really scared. Nea hasn't used Polku for a while, but she starts saving to Polku the messages and all the events and times when he is approaching her. At some point, she is advised to get a restraining order. She uses all the files she has stored in Polku to get the restraining order.

### Minna's story

*Minna is home alone. They have had another fight about an hour ago. Her spouse has rampaged the house and also thrown her on the floor, and her right arm is really hurting. Minna is feeling desperate and doesn't know what to do. Maybe she could call somebody? She takes her phone, but calling feels too difficult. She stares her phone and sees an icon of an app she has downloaded after calling to Nais-ten Linja helpline couple of weeks ago.*

*She opens the application for the first time. She puts in some PIN code without thinking too much. The application welcomes her and shows her what she can do with the application. She is recommended to put down her experiences to help her remember what has happened. There is also guidance for safety planning and some info about domestic violence.*

*After the short tour, she is asked what she would like to do? -> entry, safety plan, info? She is too tired to concentrate on anything, but she thinks she could make a note. She opens the diary and is asked how she is feeling. Out of three choices she chooses the saddest one. Next, she is asked where she was. Out of suggestions she chooses 'home'. Then she is asked what has happened? She doesn't feel like writing at the moment so she continues to the next part which is asking who she was with. She hesitates to write her spouses name and writes just an A. Then she is asked if there are some things that happen often, and whether she would like to add them as*

*keywords. Some examples are given like alcohol, arguing, etc. She chooses alcohol. He was drunk after all.*

*The app prompts a suggestion to take a photo if there is something to remember of what has happened. In some cases, it might be a bruise or messed up house or just something that helps to remember. Photos wouldn't be visible outside the app. Minna looks around the mess in the house and takes a photo of it. She also takes a photo of her arm and then saves the entry.*

*The situation of Minna doesn't change much. When her spouse drinks he gets frightening and sometimes violent. Minna makes notes in Polku every now and then, mainly photos. She has gone through the safety planning. She has now a bag packed for her and her daughter. One thing that really stopped her was reading how violence affects children, and it was devastating to make a safety plan for her child.*

*Time passes and eventually Minna manages to go to a shelter and separate from her spouse. They end up having a fight for a custody and at some point, Minna remembers that she has collected images during their violent past. She hasn't made that many entries, but even with the ones she has, it is possible for her to remember the incidents better with specific dates and photos of the abuse.*

## Usability test questionnaire 1/2

Before the usability test:

### Knowledge on ICT?

Weak 1 2 3 4 5 Professional

### Adoption of new technologies

I use familiar products 1 2 3 4 5 I try novelties

### Operating system of your phone

Windows  
Android  
iPhone

### Preconceptions of effectiveness of mobile applications in the context of abuse recovery

Ineffectual 1 2 3 4 5 Effective

### Preconceptions of the safety of mobile applications in the context of abuse

Serious threat 1 2 3 4 5 Nearly harmless

After the usability test:

### How important do you consider following features of Polku application?

#### Safety plan

Unnecessary 1 2 3 4 5 Important

#### Storing evidence

Unnecessary 1 2 3 4 5 Important

#### Diary

Unnecessary 1 2 3 4 5 Important

#### Contact to Naisten Linja

Unnecessary 1 2 3 4 5 Important

#### Information on intimate partner violence

Unnecessary 1 2 3 4 5 Important

#### Information on legal protection

Unnecessary 1 2 3 4 5 Important

#### Information on recovery and supportive content

Unnecessary 1 2 3 4 5 Important

### PIN-code

Unnecessary 1 2 3 4 5 Important

### Storing evidence outside the phone

Unnecessary 1 2 3 4 5 Important

### Fake application

Unnecessary 1 2 3 4 5 Important

### Message template and sending a message to a friend

Unnecessary 1 2 3 4 5 Important

### Users of Polku

### Would you consider recommending Polku for a person experiencing violence?

Yes  
No  
I don't know

### To whom, in what situation and which feature would you recommend?

### When would you not recommend Polku?

### What is your understanding of the potential impact of Polku?

Ineffectual 1 2 3 4 5 Effective

### What could improve the impact?

### What is your understanding of the safety of Polku?

Serious threat 1 2 3 4 5 Nearly harmless

### What could improve safety?

**Thank you for your participation! Below you can leave comments.**







**Aalto University**  
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and Architecture