



# Master Thesis

Master's Programme in Digital Service  
Innovation, 120 credits

## Asking For Help

A research through design investigation of how digital could  
help reduce domestic violence against children in Sweden

Informatics 30 credits

Halmstad, 2023-10-10

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**Abstract.** Domestic violence within the home is a critical societal issue with severe physical and psychological impacts. Research shows that children often do not disclose their abuse, making it challenging for adults to offer help. In Sweden, over 200,000 children live in households affected by various forms of violence, prompting the Swedish government to allocate over SEK 600 million in 2024 to combat domestic violence. Exposure to domestic violence often results in betrayal trauma, which can result in a child's ability to trust others. This study addresses this gap by using a Research through Design (RtD) methodology to inform the development of digital helper applications for children. The RtD process involved four phases: (1) Background Research, (2) Prototype Development, (3) Prototype Testing, and (4) Integration of New Insights and Prototype Refinement. Empirical data was gathered through three workshops with 21 participants, leading to the creation of a prototype named My Safe Place. The study identified five key design insights, (1) Anonymity and Privacy, (2) Accessibility and Usability (3), Clarity of Functionality (4), Educational Content (5) Design Adaptability. These insights aim to improve the design of digital support tools for children experiencing domestic violence within the home.

*Keywords:* Domestic Violence, Children, Sweden, Helper Application, Digital Technology and Digital Support Services.

# I Introduction

A home should be characterized by love and care, providing children with a sense of security as they grow up. The Convention on the Rights of the Child outlines children's human rights, with Article 19 specifically addressing the need to protect children from all forms of domestic violence and exploitation (UNICEF, 2024). However, this ideal does not always reflect reality. According to the Swedish Crime Prevention Council (2023), there were 24,502 reported cases of assault against children in 2023 in Sweden. The true incidence is higher due to underreporting, and the fact that many children under the age of 17 do not participate in victim surveys (Swedish Crime Prevention Council, 2023). Research indicates that children often do not disclose their experiences of domestic violence to adults, complicating efforts by external parties to provide support or protection (Socialstyrelsen, 2023). Domestic violence within the home manifests in severe forms with significant physical and psychological impacts, which can lead to behavioral issues and psychological disorders that significantly affect individuals into adulthood (Sullivan & Davies, 2023). Brown and Bzostek (2003) explains that these for example can be physical violence, emotional abuse, sexual abuse and neglect. In 2023 there were 14,315 reported cases of domestic violence against children aged 7 to 14, marking a 4 percent increase from the previous year (Swedish Crime Prevention Council, 2023).

Recent studies show that children are increasingly using digital technology to seek help, such as accessing information and communicating with support services through mobile applications (Zeng, Ye, & Mena, 2023). Domestic violence against children is a significant societal challenge that must be addressed through targeted design solutions for digital support systems (Wong & Smith, 2021). It's important to emphasize the need for tools that empower children to seek help independently, without requiring parental consent (Bruggeman, McLaughlin, Luxton, and Shore 2023). To create effective design solutions, it's essential to involve children in the design process of these technologies. Integrating their insights can ensure more innovative and user-friendly support systems by addressing their specific needs and preferences (Kumar & Trivedi, 2023)

Despite the growing reliance on digital tools for children, there remains a notable gap in the development of applications tailored to their needs in abusive contexts (Liu & Garcia, 2023). Therefore this research aims to bridge this gap by applying the Research through Design (RtD) methodology to create digital applications specifically for children experiencing domestic violence within the home. This study will explore how digital technology can be utilized effectively for children seeking help and ensure their safety in abusive situations. The research aims to explore how digital technology can

be designed to support children in these contexts, improving the effectiveness of support systems for children exposed to domestic violence with the help of research question: *How can digital technology assist children in seeking help when exposed to domestic violence?*

## 2. Literature Review

The first phase of the study involves a comprehensive literature review based on the problem statement. This review is focused on primary areas: *Domestic Violence, Digital Support Systems and Design for children exposed to Domestic Violence.*

To conduct this literature review, three key databases were utilized: Scopus, Google Scholar, and Web of Science. Scopus is renowned for its comprehensive coverage of peer-reviewed literature and high-quality web sources, while Google Scholar offers a broad search engine for academic content, including research papers, books, conference proceedings, and articles from various academic publishers. Web of Science provides detailed reference and citation data from academic journals and conference papers.

The review aimed to identify relevant studies on the design of helper applications and digital support services. Keywords employed in the search included "Helper Applications", "Digital Support Services" and "Digital Technology," as well as related terms such as "Domestic Violence," "Children," and "Sweden" to ensure a well-rounded understanding of the subject matter. Various keyword combinations were used: "Child Abuse", "Child Maltreatment", "Child Neglect" and "Domestic Abuse". Searches were conducted in both English and Swedish to capture a comprehensive range of relevant literature. The initial search produced 12,400 articles, which was subsequently narrowed down to 654 after removing duplicates. Through a detailed review of titles and abstracts, 14 pertinent papers were selected: 8 focused on the design of helper applications and 6 on related technological considerations. Additionally, the snowballing technique was employed to discover 3 additional relevant articles by examining citations within the selected papers. An overview of the literature search process and its outcomes is provided in Table 1 below.

<b>Domestic Violence</b>	<b>Design of Helper Applications</b>
<b>Keywords:</b> "Domestic Violence", "Children" and "Sweden"	<b>Keywords:</b> "Helper Application", "Digital Technology" and "Digital Support Services".

<b>Various Keyword Combinations:</b> “Child Abuse”, “Child Maltreatment”, “Child Neglect”, “Domestic Abuse”	<b>Various Keyword Combinations:</b> “Support Apps” and “Technology-Based Help Systems”
<b>Total of Articles in Search:</b> <b>4250</b>	<b>Total of Articles in Search:</b> <b>630</b>
<b>Search Interval:</b> Year: 2021-2022	<b>Search Interval:</b> Year:
<b>Relevant Papers Used:</b> 8 Papers	<b>Relevant Papers Used:</b> 6 Papers
<b>Snowballing Technique:</b> <b>3 Papers</b>	<b>Snowballing Technique:</b> <b>0</b>
<b>Included Articles:</b> 3 Articles	<b>Included Articles:</b> 6 Articles

Table 1. Overview of the literature base search in area: Domestic Violence and Design of Helper Applications.

The literature review focused on two primary areas: domestic violence against children in Sweden and *The Design of Helper Applications for children exposed to domestic violence within their home*. Key sources on domestic violence include works by Strid et al. (2021), Rädde Barnen (2020), and Socialstyrelsen (2021). Research on digital helper applications was examined through studies by Sawik and Płonka (2022), Luo and Botash (2020), and Da Silva et al. (2021). Table 2 below provides an overview of the key findings from the literature on domestic violence and the design of digital support tools for children.

<b>Area of Research:</b>	<b>Authors included:</b>
Domestic Violence	UNICEF (2024).
Domestic Violence	Swedish Crime Prevention Council (2023)
Domestic Violence	Socialstyrelsen (2023)
Domestic Violence	Sullivan & Davies (2023)
Domestic Violence	Sullivan & Davies (2023)
Digital Support Systems	Liu & Garcia (2023).
Digital Support Systems	Zeng, Ye, & Mena (2023).
Digital Support Systems	Wong & Smith (2021).
Digital Support Systems	Bruggeman, McLaughlin, Luxton, and Shore (2023).
Digital Support Systems	Kumar & Trivedi (2023).
Design for children exposed to Domestic Violence	McLaughlin & Campbell (2023)

Design for children exposed to Domestic Violence	Carter & Edwards (2023)
Design for children exposed to Domestic Violence	Patel & Kumar (2023)

*Table 2: Overview of key findings on current literature.*

## Domestic Violence

Child abuse within the home is a severe societal issue with profound physical and psychological consequences (World Health Organization, 2020), which can significantly affect individuals into adulthood (World Health Organization [WHO], 2023). It includes several forms of mistreatment, for example physical violence which involves inflicting harm through actions such as hitting, shaking, or burning a child. Immediate injuries may include bruises and fractures, while long-term effects can include chronic health conditions into adulthood (Runyan et al., 2004; Finkelhor et al., 2007). Such violence undermines the safety that a home should provide Brown and Bzostek (2003). Another example is emotional abuse which consists of actions that damage a child’s self-esteem and emotional development, such as verbal abuse or creating a hostile environment. Emotional abuse can lead to anxiety, depression, and difficulties in forming healthy relationships, often persisting into adulthood (Cicchetti & Toth, 2005). Sexual exploitation includes any sexual activity imposed on a child, such as molestation or involvement in pornography. It has severe psychological effects, including PTSD, depression, and sexual dysfunction, and is complicated by the power dynamics within the familial context (Finkelhor et al., 2007). Another example is neglect which involves failing to meet a child’s basic needs, such as inadequate supervision, poor nutrition, or lack of medical care. This can result in developmental delays, chronic health issues, and educational challenges (Gershoff & Grogan-Kaylor, 2016). Furthermore, the Public Health Agency of Sweden (2024) notes that children's mental health can be adversely affected by experiences of neglect, insecure relationships, or exposure to violence during childhood (Cicchetti, 2016). The Public Health Agency of Sweden (2022) explains that domestic violence within the home can significantly impact children's mental health and well-being.

### Mental Health in Children

The early years of a child's development are crucial for shaping their future mental health. For children in abusive households, the social and physical environment at home becomes a critical factor in their well-being (Whiting & Hardy, 2023). Domestic violence disrupts the stability and security needed for healthy development, contributing to mental health issues like depression, anxiety, and post-traumatic stress disorder. Addressing mental health in the context of domestic violence is essential to fostering a safer and healthier environment for vulnerable children (Gordon & Stevens, 2023). The early

years of a child's development are crucial for shaping their future mental health. In abusive households, the social and physical environment at home is marked by fear, instability, and emotional distress, which can severely affect a child's mental health. Domestic violence alters the conditions of upbringing, and the socio-economic and emotional strain on caregivers can further compound a child's mental health challenges. This creates a harmful cycle where both the child's environment and caregiver's mental state are compromised, leading to increased risks of mental health disorders such as anxiety, depression, and trauma-related symptoms for the child (Otgaar et al., 2019)

### **Consequences in Adulthood**

Exposure to domestic violence during childhood can have profound and enduring consequences that extend into adulthood. Individuals who experience such trauma may face a range of mental health challenges, including elevated risks for depression, anxiety, and post-traumatic stress disorder (PTSD) (Miller & Thompson, 2023). These early adverse experiences often manifest in difficulties with forming and sustaining healthy relationships, as affected individuals may struggle with issues related to trust, intimacy, and effective communication (Gordon & Stevens, 2023). Behaviorally, adults who were exposed to domestic violence as children might exhibit patterns of aggression, experience challenges in managing anger, and encounter difficulties with impulse control (Whiting & Hardy, 2023). Furthermore, these individuals often encounter socio economic difficulties, including reduced educational and career achievements, which can lead to financial instability and lower socioeconomic status (Miller & Thompson, 2023). Parenting practices can also be adversely affected, with some individuals replicating the abusive behaviors they witnessed or struggling with unresolved trauma, which impacts their parenting abilities. Additionally, the chronic stress associated with childhood exposure to domestic violence can contribute to long-term physical health problems, such as cardiovascular issues and chronic pain (Gordon & Stevens, 2023). Understanding these enduring impacts is crucial for developing comprehensive interventions and support systems for affected individuals (Whiting & Hardy, 2023).

### **Digital Support Systems for Children**

Digital support systems have emerged as vital tools in addressing and mitigating domestic violence, offering crucial resources and support for those in need within the home (Reed, Scott, & Smith, 2023). These systems provide various tools and platforms specifically designed to support the needs of children who are victims of domestic violence, helping to alleviate the challenges they face (McDonald, Toms, & King, 2023). For example, hotline

and chat services, emergency alert apps, safety planning apps, virtual counseling applications, educational apps and websites, digital support groups, interactive self-help tools, or resource directions (Brown, Rothman, & Brown, 2023). These platforms offer a discreet means of reaching out for help, especially when making a phone call might be unsafe (Goldman & Carter, 2023).

For example, Bris created an app specifically designed to support children experiencing domestic violence. This application, called BRIS11611, is available for free on both the App Store and Google Play (Bris, 2023). It includes a feature where the child can call or chat with a curator (Smith & Brown, 2023). The app is secured with a personal PIN code chosen by the user and provides anonymous, round-the-clock support. Additionally, it facilitates contact with social services in the child's municipality or school if needed. BRIS11611 is only available in Swedish and requires users to create a "Bris account" with a username, year of birth, gender, profile picture, and password. The app ensures that parental approval is not required for downloading, and no information is visible to parents (Hansson & Rydin, 2022). Digital platforms also facilitate online counseling sessions and support groups for survivors, which can be crucial for those who may not have access to in-person services or who feel safer participating online (Johnson & Lee, 2023). These systems provide educational resources about domestic violence, raising awareness and fostering understanding (Miller & Davis, 2023). Some platforms allow individuals to report incidents of domestic violence or suspicious behavior anonymously, which can be an important tool for those who fear retaliation or judgment (Taylor & Adams, 2023).

On-call-friend is a chat service provided by the Swedish Red Cross through their youth unions (RKUF), which connects individuals up to 25 years old, including children exposed to domestic violence, with trained volunteers. These volunteers offer assistance, guidance, and a listening ear to help address and mitigate the impact of domestic violence (Jegermalm & Sundh, 2005). On-call-friend can be accessed via mobile phones, computers, and tablets, allowing users to chat about any topic, regardless of their location. The chat function is available in Swedish, English, and Dari, and operates Monday to Thursday from 6 to 9 PM, and Saturday and Sunday—... ø from 2 to 5 PM. Users remain anonymous, as volunteers cannot see the user's IP address or location, and all chats are deleted weekly. Volunteers are bound by a confidentiality policy and can only seek advice from other volunteers within the service if necessary (Jegermalm & Sundh, 2005). On-call-friend collects statistics on age, gender, and chat topics to educate volunteers and understand what users want to discuss.

bSafe is another comprehensive safety application designed to provide crucial support for individuals, including children exposed to domestic violence

(DomesticShelters.org, n.d.) The app enables users to discreetly send distress signals and share their real-time GPS location with trusted contacts or emergency services. Key features include an "S.O.S." button that sends an immediate alert with location data and a "Follow Me" function for tracking movements. Additionally, bSafe includes a voice recording feature that captures audio evidence during distress situations. Its user-friendly design and discreet functionality make it an effective tool for enhancing personal safety and accessing help in critical moments (DomesticShelters.org, n.d.)

## **Design for children exposed to Domestic Violence**

Designing mobile applications to support children exposed to domestic violence requires careful attention to their unique needs, with a focus on safety, emotional well-being, and usability (Johnson & Lee, 2023; Ramos & Li, 2023). Safety and confidentiality are paramount, ensuring that the app provides anonymity and discreet access so that children can seek help without raising suspicion from their abusers. Features like a quick-exit button and disguised icons are essential, along with secure data handling practices that comply with privacy regulations such as GDPR (McLaughlin & Campbell, 2023). These practices ensure that sensitive information is not stored locally and remains inaccessible to unauthorized individuals. Additionally, the app should not require parental approval for download, as this could be a barrier in situations where a parent is the perpetrator. User-centered design is also crucial to making the app accessible and supportive for children. The language should be age-appropriate, clear, and comforting, and the interface should guide children through visual and emotional cues without overwhelming them (Carter & Edwards, 2023). Interactive tools like breathing exercises, guided relaxation techniques, or journaling can help children manage anxiety and stress. Emergency and safety features are also critical, allowing children to send discreet emergency alerts to trusted contacts or authorities, and offering immediate access to crisis support services, such as hotlines or live chats with trained counselors who specialize in helping children in violent situations.

The emotional well-being of the child is another key consideration. The app should offer a variety of coping tools tailored to different age groups. Younger children might benefit from calming activities like games or stories, while older children could access peer support or educational resources to help them better understand and navigate their situation (Patel & Kumar, 2023). The app must also ensure cultural sensitivity and inclusiveness, adapting to children from diverse backgrounds. Multilingual support and culturally appropriate resources, developed in collaboration with community leaders and experts in child psychology, will ensure the app is both trauma-sensitive and accessible. Providing psychological support within the app is crucial. Tools like anonymous chats with counselors allow children to seek

help without fear of judgment or exposure. Therapeutic resources can teach children how to recognize unhealthy behaviors, express their emotions, and safely seek help (Sullivan & Davies, 2023). Features that allow children to reach out to pre-programmed trusted contacts are important for immediate support, while follow-up features like check-ins with counselors ensure ongoing assistance as children navigate their recovery. Accessibility is also vital. The app should incorporate features like voiceover functionality and simple navigation to accommodate low-literacy users or children with disabilities. Content that could retraumatize children should be avoided, focusing instead on healing, empowerment, and practical safety guidance. Collaboration with child psychologists and the active involvement of children in the design process ensures that the app meets professional standards while aligning with the real needs of its young users (Kumar & Trivedi, 2023).

Involving children in the design of mobile applications is crucial for developing tools that effectively meet their needs and preferences. Children bring unique insights into their experiences, influencing the design process in ways that might otherwise be overlooked. As Kumar and Trivedi (2023) suggest, incorporating children in the design process allows for authentic feedback and innovative ideas. This involvement not only improves usability but also empowers children by giving them a voice in the development of tools that impact their lives, fostering a sense of ownership and validation. Research through Design (RtD) is an essential methodology that supports this involvement, emphasizing iterative design where prototypes are tested and refined based on user feedback (Zimmerman & Forlizzi, 2014). Participatory design workshops and usability testing with child participants are instrumental in capturing relevant feedback, ensuring that the app is intuitive and engaging for young users. By addressing these factors, an app designed for children exposed to domestic violence can not only provide immediate crisis support but also promote long-term emotional resilience and recovery (Ramos & Li, 2023).

### 3. Methodology

This study employs the Research through Design (RtD) approach, which is particularly valuable for addressing complex problems and developing solutions that can transform specific situations from their current state to a more desirable one (Savic & Huang, 2014). In this context, the current state involves children exposed to domestic violence, while the preferred state is enabling them to seek help through digital technology (Koskinen, Binder, Redström, & Wensveen, 2011). RtD facilitates this transformation by grounding the research in design practice, thereby generating new knowledge (Herriott, 2019). The application of RtD in this study allowed me as the

researcher, to navigate a complex and multifaceted issue (Gaver, 2012). Moreover, the RtD methodology emphasizes a forward-looking perspective, focusing on future possibilities rather than past or present conditions (Koskinen et al., 2008). Additionally, RtD provides a platform for design researchers to critically engage with and envision what the preferred state might entail, while also considering the ethical implications of design. This method further advocates for a reflective and in-depth understanding of people, problems, and the contextual factors that researchers aim to improve (Koskinen et al., 2008).

### 3.1. Research Design

In this study, the RtD approach was systematically divided into four phases (Zimmerman & Forlizzi, 2014) to effectively address the challenges encountered: (1) Background Research, (2) Prototype Creation, (3) Prototype Testing, and (4) New Information/Prototype Modification. This structured breakdown allowed for clear delineation between each phase, enabling me to maintain control and organization throughout the study (Koskinen et al., 2011). The research design progressed through these predefined phases, as illustrated in Figure below.



*Figure 1: Overview of the RtD process in the study.*

The research design followed a clear and sequential progression, adhering strictly to the phases outlined above. The process began with Background Research, which was essential for gaining a comprehensive understanding of the study area. This phase was particularly complex, as it required covering multiple topics to build a sufficient knowledge base for the next phase: Prototype Creation. To enhance my understanding of how to effectively plan and conduct workshops, I conducted ten interviews, the detailed structure of which is presented in section 4.1, "Interviews." Following this, I facilitated three workshops (WS1, WS2, and WS3) aimed at exploring how children perceive and trust their surroundings, testing and evaluating the initial prototype, and finally, assessing a modified version of the prototype. The detailed structure of these workshops is provided in section 4.2, "Workshops."

### 3.2. Method Discussion & Limitations

According to Zimmerman and Forlizzi (2014), RtD is not a formalized approach and requires the development of criteria for specifying methodologies and evaluating the quality of contributions. Currently, there is no consensus on how to document the knowledge, theories, methods, and insights that emerge from conducting RtD (Herriott, 2019). Similar to other research approaches, such as descriptive studies, RtD necessitates the

development of descriptions, guidelines, and protocols for its activities, processes, and procedures (Koskinen et al., 2011). Additionally, RtD must become more explicit about its purpose and the specific problems it seeks to address (Savic & Huang, 2014). The approach also lacks clear expectations and standards for what constitutes “good” design research, underscoring the need for actionable metrics to bring rigor to the critique of design research (Herriott, 2019). For instance, Zimmerman and Forlizzi (2014) argue that RtD will gain broader acceptance if it adopts an "agreed-upon form of practice, evaluation, and outcome.

### 3.3. Ethical Considerations in Research Involving Children

Research involving children, particularly those exposed to domestic violence, presents unique ethical challenges due to their inherent vulnerability (Kinard, 1985). Balancing the inclusion of children’s perspectives with the need to protect them was central to this study (Gaver, 2012). Key steps to address these ethical concerns included first and foremost Informed consent and Assents. Obtaining parental consent was essential due to children's lack of legal competency. To facilitate this, I worked closely with both parents and teachers. Children interested in participating were provided with an information sheet detailing the study's objectives, including the use of voice recordings and transcription, which required signatures from both parents. When obtaining consent from both parents was challenging, such as when a father was unreachable, I coordinated with a legal guardian or another responsible adult who has legal authority to provide consent on behalf of the child. This approach ensured compliance with legal requirements while accommodating the child's situation. Additionally, each child provided informed assent, where the study was explained in an age-appropriate manner to ensure their voluntary participation. I used simple language and visual aids during initial meetings to confirm their understanding and willingness.

Protecting personal data was a critical ethical consideration, given the sensitive nature of the research. There was a potential risk that parents of participating children might seek access to research results, which could compromise the children’s privacy. To address this I obtained explicit permission from children regarding the disclosure of research information. For example, if parents requested access to information, I only shared aggregated data that did not identify individual participants. Additionally, all consent forms were securely shredded, and digital data was encrypted and stored in a password-protected system to maintain confidentiality. Considering the potential psychological impact of discussing domestic violence, I implemented robust protocols for psychological support and safeguarding. Although no immediate incidents of distress occurred, the study was prepared to provide access to counseling services if needed. For example if I notice that a participant appeared distressed during an interview, I

promptly referred them to a child psychologist for additional support. This proactive approach ensured that psychological help was available if required. To minimize the risk of re-traumatization, workshops and interviews were carefully structured. Questions were designed to be sensitive, and the environment was made as supportive as possible. For example, I avoided direct questions about traumatic experiences and instead focused on general feelings and perceptions with focus on design for helper applications. Cultural sensitivity was also a key consideration, with efforts made to respect diverse backgrounds. Involving community leaders in discussions with participants from varied cultural contexts helped ensure that the study was conducted with respect for cultural norms and values. Reflecting on the potential long-term impact on participating children was also crucial. Follow-up interviews were conducted to assess any enduring effects and to provide additional support if necessary. The study was reviewed and approved by an ethical review board, which ensured compliance with relevant ethical guidelines and frameworks throughout the research process. By addressing these ethical considerations through specific practices and protocols, the study aimed to safeguard the rights and well-being of participants while achieving its research objectives. This comprehensive approach ensured that the study was conducted with the utmost respect for the children involved.

## 4. Empirical Data

To enhance the understanding of how to effectively conduct workshops with children, interviews were conducted with teachers, curators, social workers, and researchers. Additionally, the empirical data collection included three workshops (WS1, WS2, and WS3), which provided practical insights and data for the study.

### 4.1. Interviews

To gain a comprehensive understanding of how to conduct workshops with children, I conducted first individual interviews with a diverse group of professionals: four teachers, two curators, one social worker, two employees from Bris, and one researcher. All interviews were conducted in person, except for those with the two Bris employees, which were conducted via online video due to geographic distance. Interviews were not recorded or transcribed, as the primary objective was to gather qualitative insights into effective workshop practices for children. Table 2 below provides an overview of the interview participants. The participant ID includes an identifier (P for Participant) followed by a number to ensure confidentiality.

Participant ID	Gender	Age	Place of Resident	Occupation	Interview procedure	Interview Duration
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						(minutes)
<b>P1</b>	Female	51	Simrishamn	Teacher, First class	Face to Face	16
<b>P2</b>	Male	37	Ystad	Teacher, Fourth class	Face to Face	19
<b>P3</b>	Female	26	Simrishamn	Teacher, Sixth class	Face to Face	20
<b>P4</b>	Male	26	Halmstad	Teacher, Seventh class	Face to Face	23
<b>P5</b>	Male	43	Simrishamn	School Courator	Face to Face	27
<b>P6</b>	Female	37	Halmstad	School Courator	Face to Face	32
<b>P7</b>	Male	31	Malmö	Social Worker	Face to Face	37
<b>P8</b>	Female	34	Halmstad	Researcher	Face to Face	39
<b>P9</b>	Female	43	Stockholm	Employee at Bris	Online, Skype	41
<b>P10</b>	Male	39	Stockholm	Employee at Bris	Online, Skype	27

*Table 2: Overview of Interview participants, gender, place of resident, occupation, interview procedure and interview duration.*

The insights gathered from teachers revealed significant age-related differences in children's needs and behaviors. P1, who works with first-grade students aged 7, reported that this age group thrives on creative and imaginative activities, such as painting and crafting. In contrast, P2, a teacher of fourth-grade students aged 10, emphasized that children at this stage require ample space for physical activities, including running, jumping, dancing, and climbing. P3, who teaches sixth-grade students aged 11 to 12, highlighted the importance of social acceptance and peer relationships for this age group. Finally, P4, a teacher of seventh-grade students aged 13 to 14, noted that adolescents in this age range are deeply focused on exploring their identity and understanding their role in society.

The interviews with curators provided additional context on how children seek help and express their needs. P5, a school curator, observed that children aged 12 to 14 are more likely to seek help compared to younger children. However, it was noted that discussing the act of seeking help can be considered taboo among peers. P6 corroborated this view, adding that younger children are generally less likely to approach school curators with their concerns, indicating a need for targeted support for this age group. Insights from Bris employees, P9 and P10, revealed that children often prefer to communicate online to remain anonymous, which offers them a sense of

security when seeking help. This preference underscores the importance of providing confidential and accessible support channels for children.

A researcher from Halmstad University, P8, who has conducted workshops with children, emphasized the necessity of considering children's vulnerability, especially when addressing sensitive topics such as domestic violence. During the interview, P8 reviewed the WS1 guide and advised against including questions that could potentially make children uncomfortable. Based on these collective insights, it became evident that there is a substantial maturity difference between children aged 7 and 14. To accommodate these developmental differences, the workshops were organized into three distinct groups:

- **WS1:** For children aged 7 to 9
- **WS2:** For children aged 10 to 12
- **WS3:** For children aged 13 to 14
- 

This segmentation was designed to address the specific developmental needs and preferences of each age group, ensuring that the workshops were both age-appropriate and effective in engaging the participants.

## 4.2. Workshop Design and Implementation

Workshops were selected as the primary method for data collection in this study due to their interactive and practical nature, which fosters creativity and engagement (Tinder, 2016). Interacting directly with children provides valuable insights into their needs and preferences, allowing for a deeper understanding of their perspectives (Read et al., 2013). The feedback obtained from these workshops, including suggestions on design modifications such as changes to buttons or other design elements, is crucial for the iterative development process (Durin et al., 1997). The study included three workshops with children aged 7 to 14, corresponding to students from 1st to 9th grade. Given the significant developmental differences among these age groups, the workshops were divided into three distinct age categories: 7 to 9 years, 10 to 12 years, and 13 to 14 years. Each group comprised 7 participants, totaling 21 children. This division was implemented to accommodate the varied developmental stages and to ensure that all participants were peers, as a measure of ethical consideration.

An uneven number of participants per group was intentionally chosen to prevent the formation of smaller sub-groups, which could affect group dynamics and data collection. Additionally, both male and female participants were included to explore potential gender differences in how children perceive trust in their surroundings (Read et al., 2013). Based on insights from prior interviews with teachers, curators, social workers, and other professionals, different activities were planned for the various age groups:

children aged 7 to 12 were tasked with building a secret box, while those aged 13 to 14 were asked to create a diary. This distinction was made to align with the developmental interests and capabilities of each age group.

Given that Swedish was the primary language of all participants, workshop materials and questions were initially prepared in Swedish and then translated into English. The workshops were conducted at a private school in southeast Sweden. To maintain participants' engagement and comfort, fruits, water, and juice were provided during the sessions. The knowledge gained from Workshop 1 (WS1) informed the creation of the first prototype in accordance with the Research through Design (RtD) methodology. Table 3 below provides an overview of the workshop participants, including their age and gender. The participant IDs include an identifier (P for Participant) to ensure anonymity.

<b>Participant ID</b>	<b>Group 1: Age and Gender</b>	<b>Group 2: Age and Gender</b>	<b>Group 3: Age and Gender</b>
<b>P1</b>	7 years old female	10 years old male	13 years old male
<b>P2</b>	8 years old male	10 years old female	13 years old female
<b>P3</b>	9 years old male	11 years old male	14 years old female
<b>P4</b>	8 years old female	12 years old male	14 years old female
<b>P5</b>	9 years old female	11 years old female	14 years old male
<b>P6</b>	7 years old male	10 years old male	14 years old male
<b>P7</b>	7 years old male	12 years old female	13 years old female

*Table 3: Overview of gender and age of participants in the workshops*

#### **4.2.1. Workshop I Understanding Children's perception of Trust**

The primary aim of Workshop 1 (WS1) was to gain a deeper understanding of how children perceive trust in their surroundings. This was achieved through a combination of semi-structured interviews and creative activities, where participants were encouraged to build and decorate a secret box or diary. The creative process provided valuable insights into the participants' inner feelings and design choices, which were instrumental in refining the prototype

The semi-structured interviews were designed to be flexible, allowing for real-time adaptation based on participants' responses and creative expressions. For example, if a participant decorated their secret box with vibrant colors and dog-themed stickers, follow-up questions such as "Do you

have a dog?" or "Who takes your dog for walks?" were used to explore the personal significance of these choices. According to Myers and Newman (2007), it is crucial for researchers conducting semi-structured interviews to actively listen and observe how respondents answer questions, as this enhances the depth of understanding.

The materials provided for WS1 included cardboard, paint, stamps, tape, glue, colorful papers, glitter, scissors, stickers, and newspapers. Participants had complete freedom to design and embellish their secret boxes and diaries as they wished. The workshop was held in the school's art gallery in southeast Sweden, a familiar and comfortable environment for the participants due to their regular use of the space for art classes. This setting contributed to a more relaxed and inspiring atmosphere, conducive to creativity and open dialogue. The focus of WS1 was on observing the participants' approach to the creative task rather than on specific questions about their crafts. This observational approach allowed for the adaptation of interview questions to each participant's unique context. As highlighted by Read et al. (2013), semi-structured interviews are particularly effective for probing deeper into complex topics and clarifying responses.

A Workshop 1 Guide (see Appendix 1) was employed to structure the semi-structured interviews. The initial questions were designed to establish a comfortable environment for the participants. Examples of these introductory questions included: "How old are you?", "Do you know each other from before the workshop?", and "What do you like doing in your spare time?". These questions helped build rapport and set the stage for more sensitive inquiries later, such as: "Can you tell your secrets to your parents?", "Is there anything you can't tell your parents?", or "Have your parents ever gone through your belongings?". Additionally, questions addressed relationships with peers and teachers, such as: "Is there anyone else that you could tell your secrets to? For example, a sibling, a teacher, a cousin, or the school curator?". To provide a comprehensive overview of WS1, a workshop template (see Appendix 2) was created, outlining the workshop's aim, goals, location, and agenda. Overall, the combination of semi-structured interviews and creative activities in WS1 facilitated a nuanced exploration of children's perceptions of trust and their interactions with their environment.

### **Group 1: Ages 7 to 9**

The first workshop, involving children aged 7 to 9, included three females and four males, all from the same school. The participants, categorized by age (7, 8, or 9 years old), were peers within their specific age group. However, children of different ages were not familiar with each other prior to the workshop. Initially, there were signs of discomfort among the participants, as

they tended to cluster with peers they already knew. This grouping was more pronounced at the beginning of the workshop. Despite this, as the session progressed, particularly during the creative activity of building and decorating the secret boxes, the participants began to interact more freely. The introductory questions and the hands-on activity helped to alleviate initial discomfort, allowing the children to become more engaged and comfortable with one another. Gender did not significantly influence the choices made during the creative process. Both boys and girls favored bright colors and decorative elements. Notable differences did emerge, however: female participants were more likely to use animal prints, while male participants showed a preference for sports-themed designs, such as football. Below are examples of secret boxes created by an 8-year-old female and a 7-year-old male, illustrating these design preferences.



*Picture 1: Left, Secret box 8 years old female . Right, Secret box of a 7 year old male*

During the workshop, three participants—two females and one male—expressed interest in writing down their secrets once they had finished decorating their secret boxes. I assured them that it was entirely acceptable to share their secrets and emphasized that these would remain confidential and not be revealed to the group. One female participant chose to share a secret with the group: she occasionally ate candy on weekdays without her parents' knowledge. When asked why she felt unable to share this secret with her parents, she explained that her parents would become upset and, as a result, she would be prohibited from having candy the following weekend.

This topic appeared to engage the group significantly, prompting two other participants—one female and one male—to disclose similar secrets they had not previously shared with their parents: they admitted to occasionally neglecting to brush their teeth each morning. The group generally agreed that

such situations might arise but noted that not all of them felt the need to keep these matters secret from their parents. Conversely, three participants chose not to disclose any secrets and instead focused on their craft activities. These observations highlight that while some children are comfortable sharing personal secrets with their peers, others prefer to maintain their privacy.

Regarding technology use, five participants (three males and two females) each owned a personal mobile phone, while the remaining two (one female and one male) occasionally used their parents' or siblings' phones. All participants with personal phones had set screen codes, although their parents were aware of these codes. The participants reported that their parents occasionally reviewed their phone contents, particularly if they had misbehaved.

### **Group 2: Ages 10 to 12**

Group 2 comprised seven participants aged 10 to 12, including four males and three females. The group was divided into three age categories: three participants were 10 years old (two males and one female), two were 11 years old (one male and one female), and two were 12 years old (one male and one female). The participants were tasked with creating and decorating a secret box, with complete freedom in their design choices.

It was evident that the participants were familiar with each other prior to the workshop. When asked, "Do you know each other from before the workshop?" the participants revealed that their classrooms were adjacent and they greeted each other during breaks. Despite not being close peers, they communicated and collaborated effectively during the workshop. Additionally, five of the participants were connected on social media platforms such as Snapchat and Instagram.

All participants owned personal mobile phones, each protected by a screen code. Notably, one female participant, aged 11, shared her screen code with her mother. Five participants reported that their parents had reviewed their mobile phones on multiple occasions. One participant mentioned that his parents sometimes accessed his phone without his knowledge. Two participants also noted that their parents occasionally examined their personal belongings, such as their closets or school bags. For instance, a 12-year-old female participant shared that her parents disapproved of her wearing short t-shirts to school, leading her to cover up with additional clothing. This participant expressed that she would never disclose this secret to her parents, fearing their anger and potential consequences, such as having her phone confiscated.

The stories shared by participants highlighted a trend of increased parental control in this age group. For example, an 11-year-old male described how his mother had taken away his phone for a week due to his failure to report a schoolyard altercation. This suggests that children aged 10 to 12 may experience greater parental oversight.

The majority of participants preferred to confide in their peers rather than siblings or cousins. One participant had a partner but indicated a reluctance to share secrets with them. None of the participants had contacted the school curator for advice or support regarding their secrets or home issues. Instead, six participants utilized the internet, such as Google Search, to seek information on topics of interest. This behavior suggests that children aged 10 to 12 are increasingly independent in their information-seeking habits, favoring online resources over consulting peers, teachers, or family members.

There was a notable gender difference in how participants decorated their secret boxes. Female participants used bright colors, such as blue and pink, and incorporated glitter and stickers, showing more effort and enthusiasm in their designs. In contrast, male participants predominantly chose darker colors like black and dark green, and exhibited less commitment to the decoration process. For example, one male participant painted his secret box entirely dark green. See example below:



*Picture 2: Left, Secret box 11 years old girl. Right, Secret box 12 year old male.*

### **Group 3: Ages 13 to 14**

Group 3 included seven participants, comprising three females and four males, who were instructed to create a diary instead of a secret box. The participants immediately formed groups based on their age, with those of similar ages clustering together. All participants attended the same school,

which contributed to their prior acquaintance. Upon entering the art gallery, participants chose to sit further apart compared to the previous groups. Despite the relaxed atmosphere, there was a noticeable distance maintained between participants of different ages throughout the workshop. Participants expressed that forming new friendships outside their class was challenging, especially with peers of different ages. They indicated that their social interactions were predominantly limited to classmates or children in their sports clubs, emphasizing the importance of age similarity in their social circles.

Below are two examples of diaries created by participants from the 13-14 age group:

- **Picture 3 (left):** A diary decorated by a 13-year-old female, who painted it pink and adorned it with glitter stars and letters.
- **Picture 3 (right):** A diary created by a 14-year-old male, who painted it brown and attached an image of a sleeping horse with the text, “Wake me up next summer.”

These examples illustrate the gender-based differences in commitment to decorating the diaries. The females in this group demonstrated greater effort and detail in their decorations, while the males generally invested less time and creativity into their designs.



*Picture 3: Left, Diary 13 years old female . Right, Diary 14 years old male.*

In Group 3, consisting of seven participants (three females and four males), mobile phone use was a notable topic of discussion. Most participants placed their phones on the table, while others kept their phones in their pockets. All participants owned their mobile phones, and it was common practice among

them to use screen codes for security. This practice extended to other devices such as computers and tablets, reflecting a concern for personal privacy.

One 13-year-old female participant shared that her mobile phone was once confiscated by her parents due to the discovery of cigarettes in her jacket. Additionally, four other participants mentioned that their parents sometimes inspected their jackets if they suspected the presence of contraband such as alcohol, snuff, or cigarettes. However, such intrusions were infrequent, with one participant expressing frustration: "Why should they go through my belongings? They are mine!" This sentiment highlights the participants' view of themselves as approaching adulthood, with a desire for greater autonomy.

Participants in this age group struggled with disclosing certain secrets to their parents, including issues related to depression, eating disorders, or romantic relationships. For example, one participant revealed having a girlfriend and communicated this to his parents, but he would not share details about their time together. There was a general reluctance to discuss intimate moments or relationships with parents, preferring instead to confide in peers. The fear of parental anger was a significant barrier to sharing such personal matters. Among the participants, six indicated a preference for confiding in their mothers rather than their fathers if they needed to disclose sensitive information. Moreover, discussing issues with the school curator was perceived as taboo. One participant commented, "The students who contact the school curator only seek attention from other students," a view echoed by the majority in this group.

#### **4.2.1. Workshop 2 (WS2)**

The insights gained from Workshop 1 (WS1) were instrumental in the development of an initial prototype, named My Safe Place. The primary objective of My Safe Place was to help children aged 7 to 14 who are exposed to domestic violence in seeking help. Workshop 2 (WS2) aimed to conduct iterative usability testing with six participants from the target age group to refine the prototype based on user feedback.

Iterative usability testing is a methodology where a product is tested on users and subsequently refined through multiple iterations based on feedback and testing results. This approach allows designers to identify and address usability issues early in the design process, enhancing user experience before finalizing the design (ISO, 2018). Usability is defined as "the extent to which specified users can use a system, a product or service to achieve specific objectives, with expediency, efficiency, and satisfaction, in a specified context of use" (ISO, 2018). For WS2, the participants were selected to ensure an equal gender distribution to allow for a comprehensive assessment of the prototype. It was not a requirement for participants to have been exposed to

domestic violence; the focus was on evaluating the usability of My Safe Place. Each usability test was conducted individually to address the sensitive nature of the content, which could potentially evoke discomfort.

The usability tests were carried out with the same participants from WS1, with two participants from each age group, totaling six participants. According to Tinder (2016), a sample size of 3-6 participants per test is typically sufficient to identify major usability issues. The tests took place in a classroom setting at a school in southeastern Sweden. Each usability test involved the participants performing tasks using the My Safe Place prototype, allowing real users to interact with the product in a practical context (Read et al., 2013). The duration of each test ranged from 20 to 33 minutes. The sessions were audio recorded and transcribed to ensure that no crucial feedback was overlooked. Table 5 provides an overview of the participants, including their ID, age, gender, and test duration.

<b>Participant ID:</b>	<b>Age</b>	<b>Gender</b>	<b>Test Duration (minutes)</b>
<b>P1</b>	7	Female	31
<b>P2</b>	8	Male	26
<b>P3</b>	10	Male	20
<b>P4</b>	12	Female	25
<b>P5</b>	13	Female	32
<b>P6</b>	14	Male	33

*Table 5: Participant ID, age, gender and test duration in WS2.*

Usability testing was selected for Workshop 2 (WS2) due to its effectiveness in evaluating how well a prototype functions (Nielsen, 1994). This method involves having the intended users perform specific tasks (see Appendix 3) to achieve particular goals while observing their interactions and outcomes (Luo & Botash, 2020). In WS2, participants were engaged in three realistic usability tasks (see Appendix 4). The performance of these tasks was assessed based on five key components: learnability, efficiency, memorability, error management, and user satisfaction. These components provide a comprehensive understanding of how well the prototype supports user interactions and helps designers refine the design based on real user experiences (Nielsen, 1994). To gain deeper insights, the Think Aloud Method was employed during the usability tests (Ericsson & Simon, 1998). This technique requires participants to verbalize their thoughts as they work through each task, providing a window into their cognitive processes. Participants were instructed to focus on articulating their thoughts without interpreting or analyzing them during the test. The results indicated no significant gender differences in relation to the five usability components. Both male and female participants navigated and completed the three tasks

with similar ease, and their feedback on the design was consistent across genders. Table 6 below presents an overview of the five components measured during the usability tests.

Learnability:	How easy is it for users to accomplish tasks the first time they encounter the design? Is your product easy to learn how to use upon introduction?
Efficiency:	Once users have learned your design, how quickly can they perform their tasks? Is there room for improvement in the efficiency of their task flows
Memorability:	Do users remember the interface when they return? Do they have to re-learn how to use the product after a period of not using it? How easily can they reestablish proficiency?
Errors:	How many errors do users make? Are they severe? Does the UI instruct them effectively on how to recover from these errors?
Satisfaction:	How pleasant of an experience is it to use the design? Are there elements of delight and pleasant surprises for the user throughout their journey?

**Table 6:** Five components measured in the usability tests.

## Prototype Creation Process

The creation of the prototype began with the development of paper sketches (see Appendix 5). This initial phase was crucial for representing early design ideas and concepts. Paper prototyping allows designers to visualize and refine their ideas without the constraints of digital tools (Savic & Huang, 2014). By sketching out various screens and user interfaces on paper, I was able to explore different design possibilities and iterate on the basic structure of the prototype (Koskinen et al., 2008). Building on these paper sketches, I transitioned to creating an interactive prototype using clickable wireframes in Figma. Wireframes serve as visual representations of the prototype's pages, helping to organize and structure the layout of elements within the interface (Sawik & Plonka, 2022). This approach allowed for flexible adjustments based on user feedback and facilitated iterative testing during Workshop 3 (WS3). The interactive prototype was then made accessible via a link on my personal mobile phone for use in both WS2 and WS3.

Given that not all participants had their own mobile phones, My Safe Place was developed as a Progressive Web App (PWA). A PWA is a type of application software delivered through the web that functions across any platform using a standard-compliant browser, including desktops, tablets, and

mobile phones (Sawik & Plonka, 2022). PWAs offer native app features such as push notifications and offline support (Widya & Wakhidah, 2022), ensuring that My Safe Place remains functional even without an active internet connection. The usability tests revealed several strengths of the PWA approach. One participant, P6, remarked:

*“ It’s great, since I don’t have to download anything I can use My Safe Place anytime or anywhere ”*

This statement highlights the versatility of My Safe Place, demonstrating that it can be accessed anytime and from any location. For instance, if a parent seizes a user’s mobile phone, the user can still seek help through alternative devices such as a personal computer, tablet, or even a friend's mobile phone, as well as school or library computers. The usability tests revealed that participants felt more secure and comfortable using a Progressive Web App (PWA) compared to a native application. The PWA format eliminates the need for downloading an app, which enhances privacy and makes it easier for users to conceal My Safe Place if their parents inspect their mobile phone. As P6 noted:

*“ I can delete all history and nobody can see what I have been doing ”*

The decision to incorporate various colors into My Safe Place was influenced by the preferences of participants in WS1, who favored vibrant colors in their decorations of secret boxes and diaries. Colors and shapes, including familiar emojis and colorful icons, were strategically used in My Safe Place to symbolize different emotions and to enhance the visual appeal of key elements. For example, the quiz icon used colorful and easily understandable icons, with a mix of green, red, orange, and yellow, where green specifically represented positive aspects (see Picture 8). During the usability tests, all participants expressed their appreciation for the colorful design of the prototype. P2 remarked:

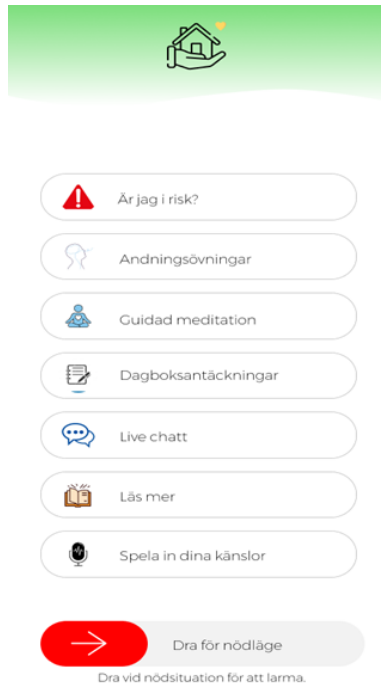
*“ I like that there's a lot of colors, it makes it not as serious even tho the topic is hard ”*

P4 also appreciated the use of colors in My Safe Place, noting:

*"I like the colors in the app. Seeing the emojis is nice. It makes it feel a bit more cheerful."*

The My Safe Place prototype featured several key elements designed to support children in various ways. These included tools for understanding if they were at risk, breathing exercises, guided meditation, journaling, live chat, information about domestic violence, and a feature to record their

feelings. Additionally, the first page included a red arrow that users could slide to immediately call emergency services (see Picture 7).



Picture 3: An overview of the different functions in the app.

However, some participants expressed concerns about the logotype. Specifically, P5 mentioned that the text "My Safe Place" beneath the icon could be problematic. P5 explained:

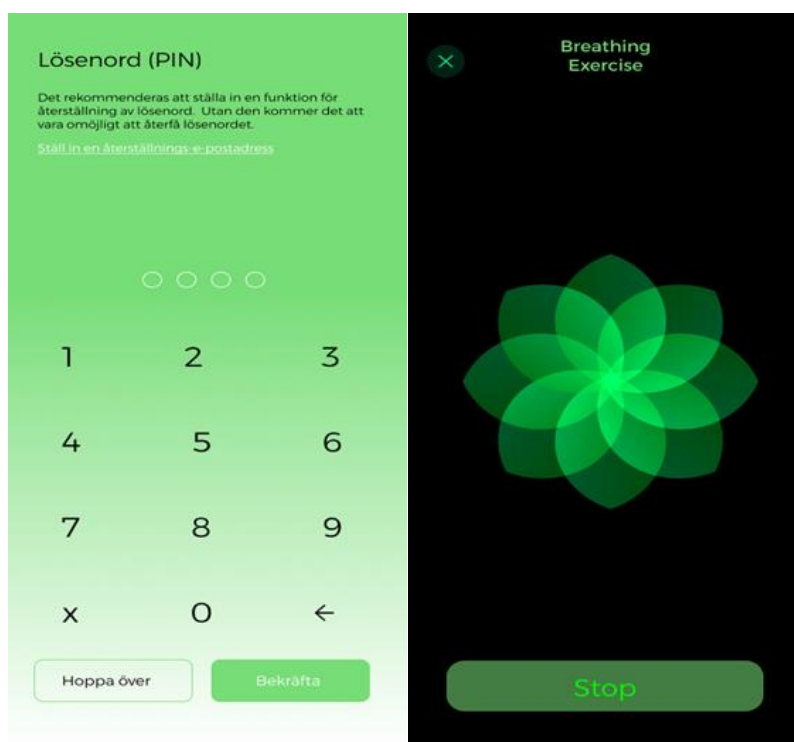
*"I sometimes forget to close down pages on my browser, and having the full text 'My Safety Place' makes it more noticeable. It could draw unwanted attention if someone else sees it."*

Based on feedback from participants, I gained valuable insights into the importance of implementing a PIN code feature within the app. As a result, a PIN code was added, requiring users to enter it each time they logged out and attempted to log back in. This feature was crucial for protecting children from sensitive content that the app may contain, ensuring that only the intended user had access to their personal information and recorded feelings. The PIN code also served as an essential safeguard against parents or guardians who might attempt to access the app without the child's consent, helping to protect the child's privacy and emotional safety. (see Picture 4)

P3 said: *"I think the PIN code feature is really important because it ensures that only I can access the app. Sometimes parents want to check everything on my phone, but there are things I record in this app that I don't feel comfortable sharing with anyone. The PIN makes me feel safer knowing they can't easily open it without my permission."*

During the workshops, participants stressed the need for a tool that would help children manage emotions like stress and anxiety, especially in overwhelming situations. One key insight was the importance of including breathing exercises in the app. Several participants shared that they often felt fear and panic, and these exercises were seen as a helpful way to regain calm.

P5 explained: *"Sometimes, when things get really stressful at home, I feel panicked and don't know how to calm down. Having something like a breathing exercise in the app would really help me feel more in control and less scared in those moments."*



Picture 4: Left, PIN code feature. Right, breathing exercise.

As a result of the workshop, it became clear that children could provide certain types of information to personalize their experience while maintaining anonymity. For example, asking for their age or age group helps tailor the content appropriately without needing exact birth dates. Users can also choose an avatar instead of a real photo to protect their identity. Additionally, allowing them to select favorite colors or themes helped personalize the app without collecting sensitive data. Participants expressed a preference for receiving reminders for activities such as breathing exercises or journaling, which can be offered without requiring contact information. Finally, the option to create a security PIN or password ensures that the child's account remains private and secure, accessible only to them.

As a result of these discussions, all workshop participants agreed that these features would significantly enhance the sense of safety and control within the app, encouraging children to engage more confidently with the platform, knowing their privacy is fully protected.

The voice recording feature, which allowed users to record their feelings, was well-received across all age groups. This feature was particularly beneficial for younger users, such as 7-year-olds, who might find it easier to express their feelings verbally rather than through writing. Participants appreciated the ability to skip, pause, or delete their voice messages, and understood that this step was optional for proceeding to the next stage.

However, it was noted that the option to skip the voice recording could be more clearly marked to avoid any confusion. When the user finished the recording or chose to skip it, a text result was displayed, such as “You are in a vulnerable situation and should seek help.” Participants found this feedback useful but suggested improvements. They recommended adding more specific guidance, ensuring privacy reassurance, and providing personalized, actionable advice or resources. Enhancing these aspects could make the feedback more supportive and reassuring for users.



*Picture 6: Record feelings*



Picture 7: Left, result after voice record. Right, informative site about domestic violence

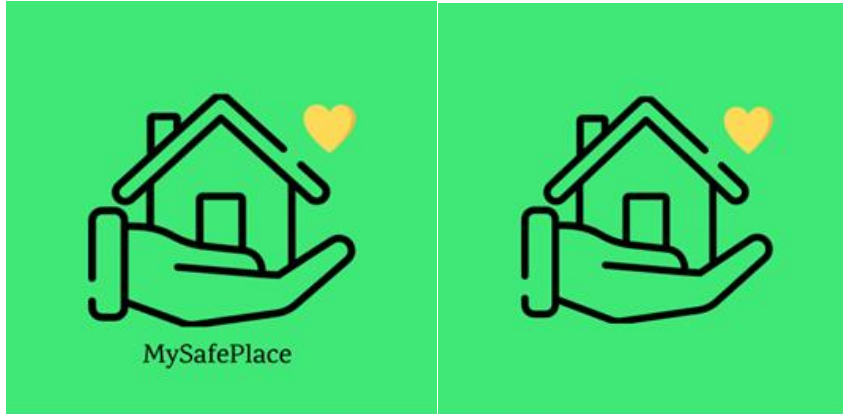
The educational section in My Safe Place was designed as an informative resource where users could read about domestic violence and related topics (See picture 7). This feature was included based on insights from WS1, where participants expressed a preference for finding information independently rather than seeking help from others. By providing accessible information, the educational section aims to help children who may struggle to recognize or understand their exposure to domestic violence. It offers them valuable knowledge and supports their awareness of their situation.

Children aged 7-9 found the information difficult to understand and felt overwhelmed by the amount of text on one page. P1 said, *“I don’t understand everything and it’s too much to read.”* P2 added, *“I feel overwhelmed looking at this much text and I can’t read it.”*

#### 4.2.1 Workshop 3 (WS3)

The aim of WS3 was to test a modified version of My Safe Place based on feedback from WS2. The WS3 template (See Appendix 6) provided an overview of the workshop. The adjustments made to My Safe Place included changes to the logotype, information form, emergency slide, and educational content. These changes aimed to improve the design and functionality of the digital support for children exposed to domestic violence.

Participants in WS3 did not face any difficulties using the updated My Safe Place, and the interface was easy to understand. The removal of "My safe place" from the logotype was particularly well-received. P3 noted, "It feels much more safe now that nobody can see what site I'm looking at." The adjustment to the logotype, as shown in the picture below, helped participants feel more secure.



*Picture 8: Left, Logotype before adjustment. Right logotype after adjustment*

In WS3, several adjustments were made to My Safe Place based on feedback from WS2. One of the major changes made was replacing all photographs with illustrations. This adjustment was implemented to enhance privacy and ensure the app felt safer and more approachable for children. These changes resulted in children feeling safer and more comfortable using the app. By using illustrations instead of photographs, the app became less personal and potentially less intimidating, allowing children to engage with the content without fear of being identified or exposed. The use of illustrations also made the app feel more child-friendly, approachable, and less overwhelming, encouraging them to explore sensitive topics in a non-threatening way. (see picture 9)

*P3 said: I feel better using the app with the drawings instead of real pictures. The cartoons make it easier to talk about what's happening without feeling scared"*



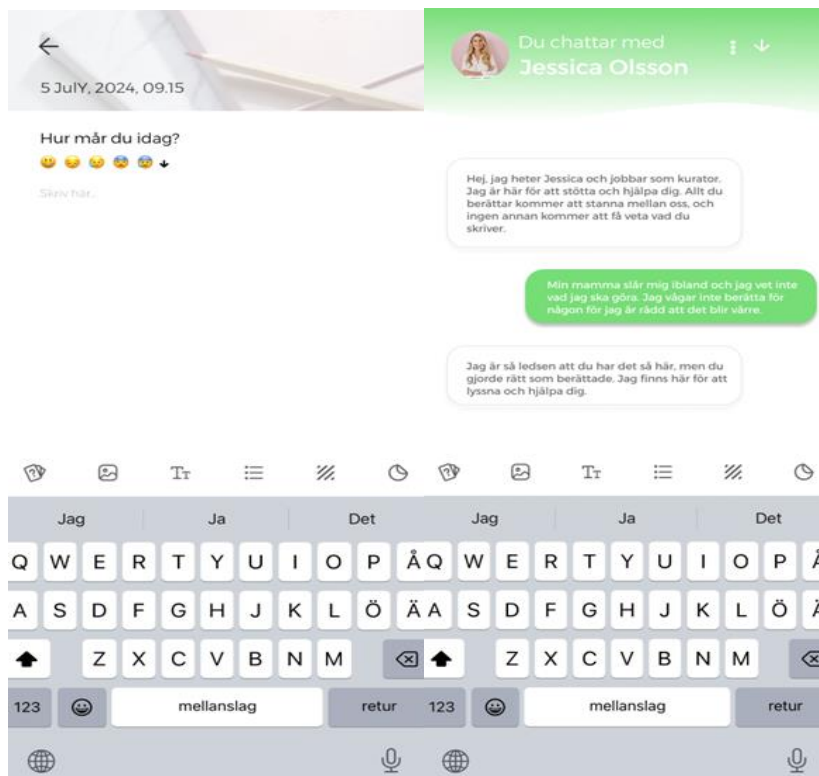
Picture 9: Left, adjusted educational function. Right: Emergency button.

As a result of the workshop, several participants expressed the importance of having an emergency call button easily accessible within the app. One participant explained that knowing they could quickly contact help if they were in immediate danger gave them a sense of relief and security.

P5 shared, *"It makes me feel safer knowing that I can press the button if things get really bad. It's like having help right there, even when I feel alone."* This feature was highlighted as crucial for providing the participants with a sense of control in high-stress situations.

During the workshop, participants emphasized the value of including a journaling feature within the app. One participant shared how writing about their feelings helps them process emotions more clearly, saying, *"Being able to write down how I feel every day makes it easier to understand what's happening inside me. Sometimes it's hard to talk about it, but writing feels safer."* This feature was seen as a key tool for self-reflection and emotional release, especially for children who may struggle to verbalize their feelings.

In the workshop, participants highlighted the importance of having a live chat feature with a curator available in the app. One participant explained, *"Sometimes I just need to talk to someone right away, and knowing there's a safe person to chat with makes me feel less alone."* This feature was considered essential for children seeking immediate support, offering them a direct, confidential way to express their concerns and receive guidance when they feel isolated or in need of help.



Picture 10: Left, added speaker. Right overview and amount of articles

In the development of the application designed for children exposed to domestic violence, an accessibility feature was incorporated to enhance usability for children with disabilities. Specifically, a text-to-speech function was integrated to ensure that all users, regardless of their reading abilities, could comprehend the content effectively. This feature supports children with visual impairments and those with reading difficulties, thereby promoting inclusivity. Feedback from some participants indicated that this function significantly improved their engagement with the application, as it allowed them to access information more easily and feel more included in the experience. This positive response underscores the importance of accessibility features in creating supportive and effective tools for all users.

## 5. Discussion

Designing mobile applications to support children exposed to domestic violence requires meticulous attention to their unique needs, emphasizing safety, emotional well-being, and usability. The insights presented in the thesis were derived from a structured evaluation process, incorporating direct feedback from child users through iterative workshops and usability tests. This approach ensured that the final prototype not only met design objectives but also aligned with the real needs of its young users.

The initial workshops (WS1 and WS2) provided valuable insights into the preferences and behaviors of children across different age groups. For instance, the decoration choices in secret boxes and diaries revealed age- and gender-specific aesthetic preferences. These findings guided the prototype's colorful and engaging design, aligning it with the users' tastes and enhancing their interaction with the application.

In WS2, usability tests further refined the prototype based on practical feedback. Issues related to anonymity, such as the need for a quick-exit button and disguised icons, were identified and addressed. These features are essential for ensuring that children can use the app discreetly without raising suspicion from their abusers. Secure data handling practices were also emphasized, adhering to privacy regulations like GDPR to protect sensitive information from unauthorized access. The removal of parental approval requirements for app downloads was another critical adjustment, ensuring that the app remains accessible even in situations where a parent is the perpetrator. The iterative nature of the design process, involving continuous testing and refinement, ensured that the prototype effectively addressed the issues highlighted in earlier workshops. The final prototype was tested in WS3 to confirm that the modifications resolved previous concerns and met the users' needs for anonymity and usability.

Furthermore, the application design took into account various critical factors. Emotional well-being was prioritized by incorporating age-appropriate language, interactive tools for anxiety management, and culturally sensitive resources. The inclusion of features like anonymous chats with counselors and pre-programmed trusted contacts provided crucial support mechanisms for children navigating their recovery. Accessibility features, such as voiceover functionality and simple navigation, were integrated to accommodate low-literacy users and children with disabilities, ensuring that the app is inclusive and supportive.

Involving children in the design process was fundamental to developing an effective tool. As Koskinen et al. (2008) highlight, their direct feedback and insights were invaluable in shaping a user-centered design that truly meets their needs. Research through Design (RtD) methodology, which emphasizes iterative testing and refinement based on user feedback (Zimmerman & Forlizzi, 2014), was pivotal in capturing relevant insights and ensuring that the app remained intuitive and engaging. Overall, the development and evaluation of the My Safe Place prototype demonstrate how thoughtful design, grounded in real user feedback, can create a mobile application that provides both immediate crisis support and long-term emotional resilience for children exposed to domestic violence. By addressing safety, confidentiality,

and usability, the app stands as a comprehensive tool aimed at supporting young users in a sensitive and effective manner.

## 5.1 Final Prototype

The My Safe Place prototype was developed as a Progressive Web Application (PWA) to ensure broad accessibility for all users, reflecting insights from the literature review. Unlike native applications, which require downloading, a PWA can be accessed directly via a web browser. This design choice was crucial because not all participants had their own mobile phones, tablets, or computers. In WS2, it was noted that some participants with their own mobile phones lacked internet access. The PWA allowed them to access My Safe Place's functions even without a constant connection, and those without personal devices could use shared or family devices, with the option to delete browsing history to maintain privacy. This format also facilitated discreet usage, enabling users to easily hide My Safe Place from parental scrutiny. Thus, the PWA approach ensured broader accessibility and flexibility, addressing the needs of children exposed to domestic violence.

Designing for children in sensitive contexts like domestic violence requires meticulous attention to detail. Feedback from WS1 revealed concerns that quiz responses might be sent to their school or social services without their consent, causing apprehension about using My Safe Place. This concern is supported by literature on digital support systems, which emphasizes the importance of ensuring user confidentiality and safety (Hansson & Rydin, 2022; Jegermalm & Sundh, 2005). To address this concern, the modified version of My Safe Place removed the email requirement from the information form and relocated the form to the end of the quiz. This change was well-received in WS3, with participants feeling more secure and anonymous.

Another significant modification involved the removal of the text “My Safe Place” from the logotype. Participants in WS2 indicated that this change made them feel safer, as it reduced the visibility of sensitive content on their devices. This update aligns with research highlighting the importance of reducing overtly sensitive labels to enhance user comfort and privacy (Jegermalm & Sundh, 2005). This adjustment contributed to a more positive user experience in WS3.

Clarity in the prototype's functionality was also a key focus. Younger participants (ages 7-10) struggled to understand the emergency slide function, leading to the addition of “SOS” text to clearly indicate its purpose. Illustrations were added to the educational section to help convey information about domestic violence and related topics more effectively. Additionally, a speaker function was introduced to read the educational content aloud, which

was particularly beneficial for younger users who found the text overwhelming. Feedback showed that these enhancements made the educational section more accessible and easier to comprehend, reflecting the literature's emphasis on tailoring digital resources to the developmental needs of children (Koskinen et al., 2008; Zimmerman & Forlizzi, 2014). No significant gender differences were observed in the usability tests, as both female and male participants provided similar feedback regarding the prototype's functionality and design.

In summary, the iterative design and testing process—incorporating user feedback from WS1 and WS2—led to meaningful improvements in My Safe Place. The adjustments based on user insights ensured that the final prototype effectively addressed key concerns and provided a safer, more intuitive experience for children seeking help. The iterative approach and user-centered design modifications highlight how insights from existing literature and user feedback were directly applied to enhance the prototype's usability and effectiveness.

## 6. Conclusion and Future Research

In this study, I explored how digital technology can help children in seeking help when exposed to domestic violence. To address this, I followed a Research through Design (RtD) process, structured into four phases: (1) Background Research, (2) Prototype Creation, (3) Prototype Testing, and (4) Integration of New Insights/Modified Prototype. Empirical data were collected through three workshops involving 21 participants aged between seven and fourteen.

Workshop 1 focused on understanding how children perceive trust in their surroundings, such as peers and friends. Based on these insights, a prototype called My Safe Place was developed to help children seek help in cases of domestic violence. The study found no significant gender differences, with both females and males presenting similar issues and feedback.

The research yielded five key design insights for creating digital support solutions for children aged seven to fourteen:

1. **Anonymity and Privacy:** Children expressed significant concerns about privacy, especially regarding personal information, for example email addresses. To address this, My Safe Place was designed to avoid requesting sensitive information and included features to enhance anonymity and discretion.
2. **Accessibility and Usability:** The PWA format of My Safe Place was chosen to ensure accessibility across various devices and to

accommodate users with limited internet access. This format also allowed users to use My Safe Place discreetly on shared devices without leaving traces.

3. **Clarity of Functionality:** Younger children had difficulty understanding certain features, such as the emergency slide. Adding clear labels like “SOS” and providing illustrative elements improved comprehension of these functions.

4. **Educational Content:** The educational section of My Safe Place initially contained too much text for younger users, leading to feelings of being overwhelmed. Adjustments included adding a speaker function to read text aloud and incorporating illustrations to make the content more engaging and understandable.

5. **Design Adaptability:** Feedback indicated that making design changes based on user insights, such as removing potentially alarming text from the logotype and modifying the placement of the information form, significantly improved the users' sense of safety and comfort.

These insights demonstrate the importance of incorporating user feedback into the design process to create effective digital solutions that address the needs and concerns of children in vulnerable situations.

## Acknowledgement

I extend my sincere gratitude to everyone who contributed to this study. First and foremost, I want to thank my family for their unwavering support and inspiration throughout this journey. I am also deeply appreciative of my supervisor, Andrea Resmini, for his dedication and guidance, which were instrumental in helping me achieve my best. Additionally, I am grateful to each participant who shared their thoughts and experiences in the workshops; their valuable input was crucial to the success of this study.

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## Appendix I: WSI Interview guide

### Introductory Questions

1. How old are you?
2. Have you known each other before the workshop?
3. What do you like doing in your spare time?
4. Who do you like spending your free time with?
5. What do you like doing when you are at home?

### Trust to Parents

6. Do you spend a lot of time with your parents?
7. Which one of your parents do you spend more time with?
8. How often do you spend time with your parents?
9. What do you do with your parents when you spend time together?
10. What do you talk about with your parents?
11. Which one of your parents do you trust the most?

12. Which one of your parents do you seek out first if something has happened?
13. Can you tell your secrets to your parents? If Yes, question 14 : If no, question 15.
14. What type of secrets do you feel comfortable telling?
15. How come you don't like telling your parents your secrets?
16. Is there any secret you would never tell your parents? If no,

#### Trust to other people in their surrounding

17. Who would you tell this secret to instead?
18. Why do you tell your secrets to this person?
19. Do you trust this person? why?
20. Who do you trust more, your parents - or this person? How come?
21. Is there anyone except for this person you could tell your secrets to?  
*For example, a sibling, a teacher, cousin, or the curator in school.*

#### Belongings

22. Has it ever happened that someone went through your personal belongings? *It can be all from your phone, your closet, secret diary, or your computer.* If yes, question 23 to
23. Who was this person?
24. Why do you think this person went through your belongings?
25. Is that something they do on a regular basis or- special occasions? If yes, What special occasions can that be for example?
26. Did you start hiding your things after this? Or have you always hidden things?
27. Do you have your own phone / tablet/ playstation / computer?
28. Do you have a code on your belongings?
29. Does anyone know your code ?
30. Why did you tell this person your code?

## Appendix 2: WSI Template/ Overview

<b>Aim:</b>	The aim with WS 1 is to get a better understanding of how children between the age of 7 and 14 perceive trust to their surroundings. This can for example be their parents, peers, siblings, curator etc.
<b>Result:</b>	Expected result in WS1 is that to get a better understanding of how children between the age of 7 and 14 perceive trust to their surroundings. The knowledge gained in WS1 is supposed to contribute to a first draft of a prototype with the aim to help children exposed to domestic violence to seek help.

<b>Location:</b>	Art gallery in a school in southeast Sweden.
<b>Agenda:</b>	<ol style="list-style-type: none"> <li>1. Receive signed paper by parents</li> <li>2. Pick out materials for the making of a secret box and diary.</li> <li>3. Start voice recorder</li> <li>4. Welcome all participants and make observations of how they act and feel with each other.</li> <li>5. Explain the workshop aim &amp; their rights in the workshop /offer fruit, water etc.</li> <li>6. Start with introductory questions</li> <li>7. Start workshop &amp; interview</li> <li>8. Thank everyone.</li> </ol>

### Appendix 3: WS2 Template / Overview

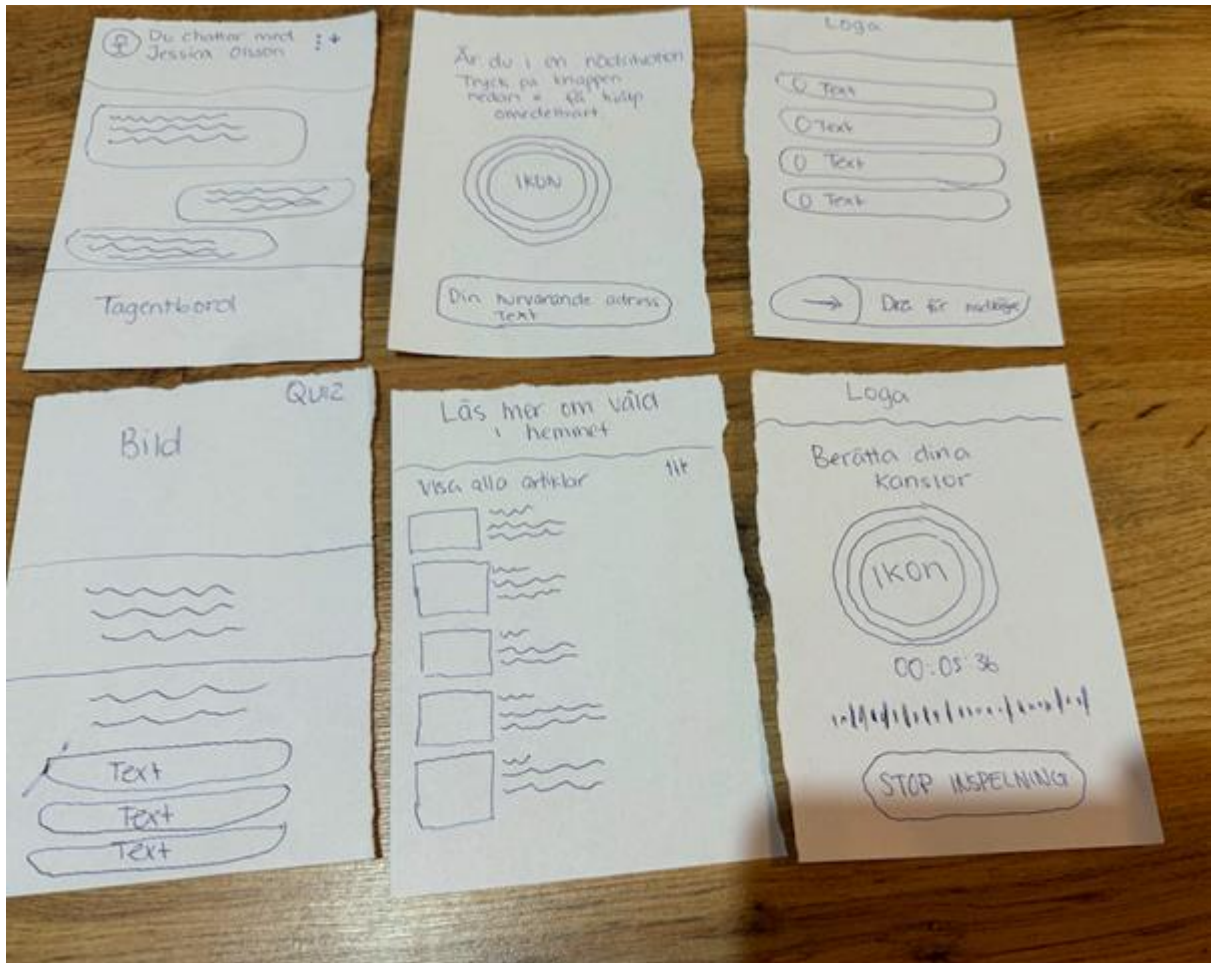
<b>Aim:</b>	Test prototype and get feedback
<b>Result:</b>	Expected results in WS2 is to get feedback from first draft of prototype that results in better understanding of design qualities to
<b>Location:</b>	Classroom in a school in southeast Sweden.
<b>Agenda:</b>	<ol style="list-style-type: none"> <li>1. Receive signed paper by parent</li> <li>2. Start voice recording.</li> <li>3. Explain workshop aim &amp; their rights.</li> <li>4. Explain usability tasks.</li> <li>5. Observe and listen, ask questions if needed.</li> <li>6. Thank each participant.</li> </ol>

### Appendix 4: Use Tasks Tests, WS2 & WS3

<b>Task:</b>	<b>Aim:</b>
<b>1: Perform the quiz and report to the school.</b>	<ul style="list-style-type: none"> <li>• How easy is it for users to accomplish the tasks for the first /second time they encounter with My Safe Place?</li> <li>• Is your product easy to learn how to use upon introduction?</li> <li>• How pleasant of an experience is the function?</li> <li>• Is there any gender difference?</li> <li>• Is there any age difference?</li> <li>• How many errors do users make?</li> <li>• Do users remember the interface when they return?</li> </ul>

	<ul style="list-style-type: none"> <li>• Do they have to re-learn how to use the product after a period of not using it? How easily can they reestablish proficiency?</li> <li>• How quickly can they perform their tasks?</li> </ul>
<p><b>2: Record a voice message and send it to the social service in the municipality.</b></p>	<ul style="list-style-type: none"> <li>• How easy is it for users to accomplish the tasks for the first/second time they encounter with My Safe Place?</li> <li>• Is your product easy to learn how to use upon introduction?</li> <li>• How pleasant of an experience is the function?</li> <li>• Is there any gender difference?</li> <li>• Is there any age difference?</li> <li>• How many errors do users make?</li> </ul>
<p><b>3: Read about the different information topics.</b></p>	<ul style="list-style-type: none"> <li>• How easy is it for users to accomplish the tasks for the first time they encounter My Safe Place?</li> <li>• Is your product easy to learn how to use upon introduction?</li> <li>• How pleasant of an experience is the function?</li> <li>• Is there any gender difference?</li> <li>• Is there any age difference?</li> <li>• How many errors do users make?</li> </ul>

## Appendix 5: Prototype Sketches



## Appendix 6: WS3 Template / Overview

<b>Aim:</b>	Test modified and adjusted prototype based on feedback gained in WS1.
<b>Result:</b>	Expected results in WS3 is feedback on adjustments in prototype
<b>Location:</b>	Classroom in a school in southeast Sweden.
<b>Agenda:</b>	<ol style="list-style-type: none"> <li>1. Receive signed paper by parents</li> <li>2. Start voice recording.</li> <li>3. Explain workshop aim &amp; their rights.</li> <li>4. Explain usability tasks.</li> <li>5. Observe and listen, ask questions if needed.</li> <li>6. Thank each participant.</li> </ol>

