

The background is a stylized, colorful landscape. It features a large, textured brown hill in the center. To the right, there are blue and purple mountains. The sky is a mix of orange and yellow, with two white, fluffy clouds. In the foreground, there are green hills, a blue body of water, and several green trees. A yellow path winds through the landscape on the left side.

# Designing a communication tool for children with remote parents.

**MED 10 - 1**

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## ABSTRACT

ENGLISH: This report investigates the relation between children and their physically absent parent, in particular focusing on the communication and relation between them. During the project personas has been developed in order to create guidelines for how an application should be developed to assist these. The application is supposed to create a bridge between the child and the parent.

*Keywords: Child-computer interaction, Personas, User-centred design, Phenomenology, Physical absence.*

DANSK: Denne rapport undersøger forholdet mellem børn og deres fysisk fraværende forældre, med fokus på kommunikation og forholdet mellem dem. I løbet af dette projekt er der blevet udviklet personaer til at guide udviklingen af hvordan en applikation kan udvikles til at møde deres behov. Denne applikation er ment til at danne bro mellem barnet og forældren.

*Nøgleord: Barn-computer interaktion, Personaer, Bruger-centreret design, Fænomenologi, Fysisk fravær.*

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## TABLE OF CONTENT

1. INTRODUCTION .....	6	3.4.2 Interaction Analysis .....	19
1.1. TARGET GROUP .....	6	4. PHASE 1 .....	21
1.1.1 Stakeholders .....	7	4.1. DESIGN & DEVELOPMENT .....	21
1.2. PROBLEM STATEMENT .....	7	4.1.1 Hypothesised Users .....	21
1.3. RESEARCH QUESTIONS .....	7	4.1.2 Participants .....	22
2. RELATED WORK .....	8	4.1.3 Proof-of-Concept Prototype .....	22
2.1. CHILD-COMPUTER INTERACTION .....	8	4.1.4 Questionnaire .....	23
2.1.1 Players, learners or users - PLU model .....	9	4.1.5 Interviews .....	24
2.1.2 Child-parent communication .....	9	4.2. RESULTS .....	24
2.1. MILITARY FAMILIES .....	11	4.2.1 Interview results .....	24
3. METHODOLOGY .....	13	4.2.2 Questionnaire results .....	25
3.1. PHENOMENOLOGICAL STANDPOINT .....	13	5. PHASE 2 .....	27
3.2. RESEARCH DESIGN .....	14	5.1. DESIGN & DEVELOPMENT .....	27
3.2.1 Design Phases .....	14	5.1.1 Initial Personas .....	27
3.3. DATA GATHERING .....	15	5.1.1 Participants .....	28
3.3.1 Focus Group Interview .....	16	5.1.2 Functional Prototype .....	28
3.3.2 Evaluating the Prototype .....	17	5.1.3 Questionnaire .....	30
3.3.3 Setup & Procedure .....	17	5.1.4 Interviews .....	30
3.3.1 Ethics .....	18	5.2. RESULTS .....	30
3.4. DATA TREATMENT .....	18	5.2.1 Questionnaire results .....	30
3.4.1 Personas .....	19	5.2.2 Interview results .....	31
		5.2.3 Interaction Analysis Evaluation .....	33
		5.2.1 Final Personas .....	34

6. DISCUSSION .....	39
6.1. Participants.....	39
6.2. Interview .....	39
6.3. Evaluating the Prototype.....	40
6.1. Research Design.....	41
6.2. Personas and Scenarios .....	42
7. FURTHER DEVELOPMENT .....	43
7.1. Child application.....	43
7.1. Parent application.....	43
7.2. Personas .....	44
8. CONCLUSION.....	45
REFERENCES .....	46

Fig. 5: In-game picture of Pixeline - Skolebøger (KreaKids, 2016). .....	22
Fig. 6: Visualisation of the PoC prototype.....	23
Fig. 7: The diary screen with the smiley system. ....	23
Fig. 8: The photo album screen.....	23
Fig. 9: Picture of WhatsApp's receipt system (Hughes, 2014). ....	25
Fig. 10: Summary of Phase 1. ....	26
Fig. 11: Sketch of infrastructure of the Functional Prototype. ....	28
Fig. 12: Map of tasks in the functional prototype. ....	28
Fig. 13: Promotional picture of Candy Crush Saga (Zahid, 2013).....	29
Fig. 14: Task with picture adding system. ....	29
Fig. 15: Information button. ....	30
Fig. 16: Interview session. ....	31
Fig. 17: Interview with the children at the Jacobsen family. ....	33
Fig. 18: Picture taken by the users with the functional prototype.....	34
Fig. 19: Representation of parents visualized through System of Coordinates. .....	34
Fig. 20: Summary of Phase 2. ....	38
Fig. 21: Adaptation of the SUS to the Funometer system.....	40
Fig. 22: A waterfall model showing the two phases with findings, leading into a Phase 3. ....	43
Fig. 23: Picture of the Photo menu with added functionalities. ....	43

## FIGURE LIST

Fig. 1: Picture of the child's Globetoddlers interface (Modlitba, 2008, p.65).	9
Fig. 2: Photos showing eKISS, above is the child taking a picture, below is the parent receiving the picture (Dalsgaard et al., 2007, p.70).	10
Fig. 3: Picture of a page in Missionen går til... showing suggestions for pictures (Høgsted & Bertelsen, 2008, p.48).	12
Fig. 4: Illustration of the iterative design cycle.	14



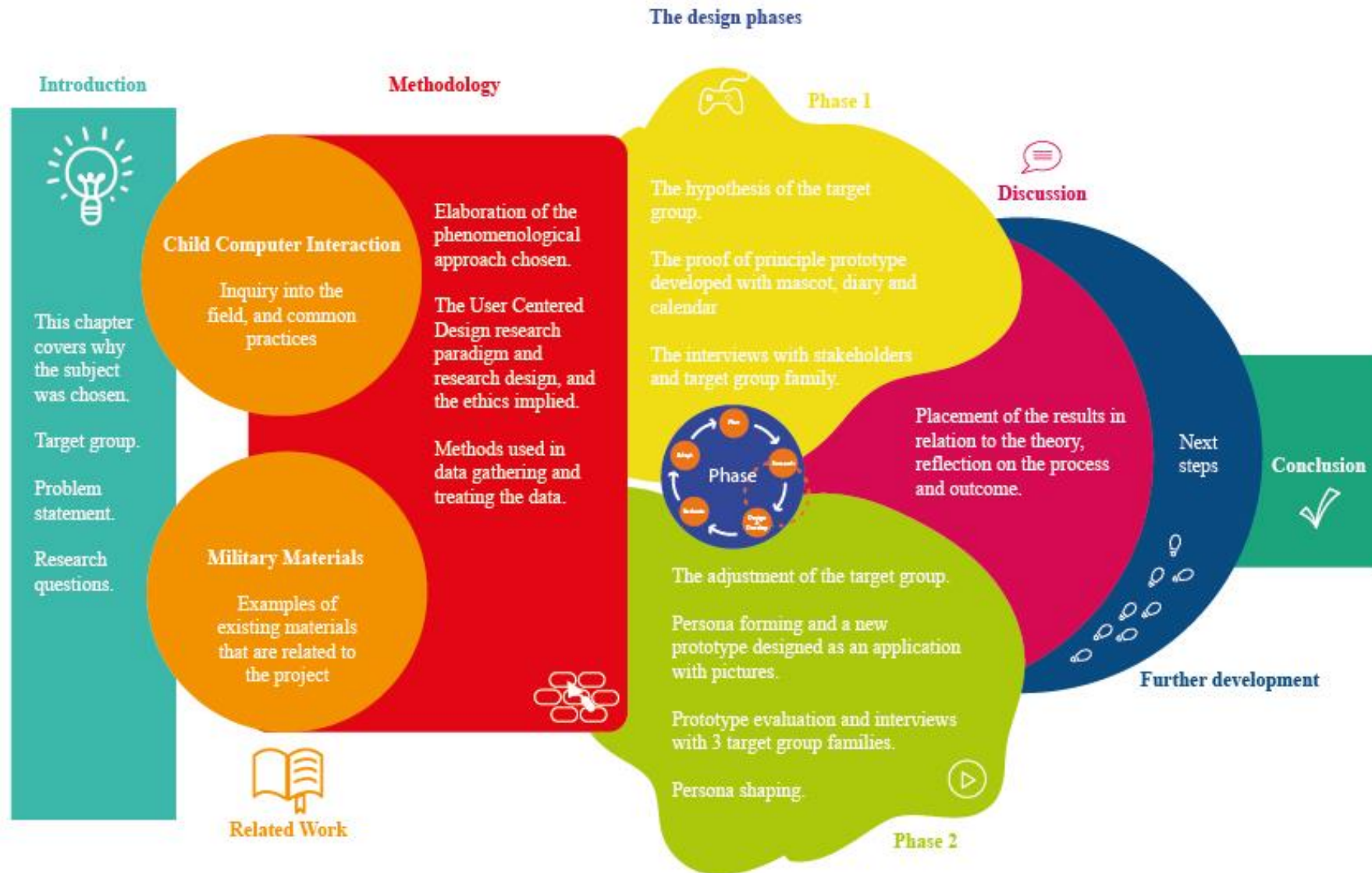
### **READER'S GUIDE:**

The structure of this thesis is build around the phases, which present the research, design and development of this project. Before going into the actual structure of the design process, however, the basis for the research will be covered through a problem statement and connected research questions, further grounded in a theoretical framework and related work. Furthermore, the overall methodology, along with methods and procedure for data gathering and treatment will be covered. All of these forming and guiding the subsequent phases and the entire thesis in general. Research and design findings will be introduced as part of each phase and analysed and evaluated in relation thereto.

During the thesis we, the authors, are referred to as both researchers and designers, as well as interviewers, with the participants sometimes being referred to as interviewees or users.

All the gathered data is confidential and the identity of participants are kept anonymous, which means that photos and screenshots of video material have been modified by using the filter provided by Cartoonize.net (2010).

## DESIGNING A COMMUNICATION TOOL FOR CHILDREN WITH REMOTE PARENTS



# 1. INTRODUCTION

Today different events require people to travel and live abroad from their family for different durations of time, be it for a business trip, because of divorce, as part of serving the military, or similar (Yarosh, Cuzzort, Müller & Abowd, 2009). During these periods of separation the communication between the family members transpires through different technological channels, which have become more and more common, such as video calls (Ames, Go, Kaye, & Spasojevic, 2010; Modlitba, 2008). The remote communication between child and parent is difficult, and for younger children, who cannot write or read, it can be even harder, as it has to go through an adult. Video calls can alleviate some of these problems but there are still challenges associated with these (Yarosh, 2015). This is not ideal as communication between children and their parents, as well as the parent's interest in the life of the child, is crucial for their well-being (Yarosh, Davis, Modlitba, Skov, & Vetere, 2009, p.285-286). It is also worth keeping in mind that play is important, as "people connect with children (whether close or far) through play, rather than conversation" (Follmer, Raffle, Go & Ishii, 2010), which is done in order to strengthen the emotional bonds and relationships (Ames et al., 2010).

Studies have been dedicated to investigating new methods for child-parent communication in situation where they are separated, however, according to Yarosh (2015) "children's role in initiating interaction with remote family members has largely remained unexplored" (p.2). Additionally, Yarosh and Abowd (2011) argue that "the biggest need in designing for work-separated families is in supporting military parents." (p.1193), which leads this thesis towards a focus on military families. In military families children and parents are separated for several months at a time (Yarosh et al., 2009), and the remote parent is faced with an added risk compared to other work-related separations.

"The military is probably the only organisation that is ready to risk its partial destruction and to put the lives of its members will fully at risk when aiming to reach its goals." (Caforio, Haltiner, Jelusic, Moelker & Tresch, 2015, p.8)

This thesis was inspired from a previous study (Jensen, Juganaru, & Kyed, 2016, unpublished master's project), where the Danish military, Forsvaret was contacted and an interview was conducted. During the study it became apparent that Forsvaret are aware of, how the relatives and family of the soldiers are affected during departure, as a Major from Hærens Kamp- og Ildstøtcenter at Oksbøllejren states in an interview conducted as part of the study that "there is no doubt that people are burdened when they get home, it is everything from what they have experienced out there to simply being away from the family for half a year, which is hard for the family" (Jensen et al., pp. 54-55, unpublished master's project). In addition, a study on what affects the relatives of soldiers stationed in Kosovo and Afghanistan, conducted by Institut for Militærpsykologi, found that the relatives are worried about the soldier losing his life, being physically and/or psychologically injured, with the worry for physical injury being highest before the soldier leaves home, and the worry about psychological injury being highest during the entire deployment (Forsvarsakademiet, 2011).

The interview revealed that Forsvaret did not focus on this during the 90s, but that they do now, with printed materials handed to the families, and the department Veterancentret (n.d.) dedicated to helping the soldiers and their relatives before, during and after departure (Jensen et al., p. 55, unpublished). In a variety of printed materials published by Forsvaret, they target children (Rohde, 2015; Haahr, 2012; Skov, 2005; Høgsted & Bertelsen, 2008), as well as parents (Høgsted, 2008; Meyer, Lippert, & Høgsted, n.d.). The military community is therefore of interest, and this specific field served as an entry point for this project, which will be reported in this thesis.

## 1.1. TARGET GROUP

The main target group is Danish children and their parents, specifically children of families where at least one parent travels often, with the age group being 5-12 years old, as this is primarily the age group considered when designing applications for child-computer interaction (Read &

Markopoulos, 2013, p.2). Additionally, this age range also marks the point where children attend pre-school and then assume grade school, as well as ending with the formal transition into teenage years. Coincidentally, the end of the age group also marks when children will be old enough to create social media account, such as a Facebook account (Facebook, 2016).

The age group was initially set to 5-8 years old during the initial hypothesis that was built on theoretical research, as presented later in *Phase 1*. After the interviews, the target group has been set to children between 5-12 years, leading to the development of personas.

### 1.1.1 Stakeholders

The different stakeholders, who would benefit from an application targeting children and families and organisations, in which people are employed and working away from their relatives, specifically in relation to military families, Forsvaret and different branches inside it, such as Veterancentret, Familienetværket, and Varde Kaserne, where we spoke with soldiers that maintain family contacts.

## 1.2. PROBLEM STATEMENT

Communication with parents is crucial for children during long-term separation. Studies have been done in order to develop prototypes to support children and their parents, however focus has rarely been on the child as the initiator of interaction and communication. It is therefore important to develop an application that focuses on the child's needs and fits their situation during the periods, where they are separated from their parent(s).

Therefore, this project aims to design and develop an application building on the above, and in relation to this investigate the requirements and needs of Danish children between the age of 5-12 and their parents through a user-centred design (UCD) approach, with initial focus on military families, who

will be visited during the development of the application. With this in mind the following research questions will be answered:

### 1.3. RESEARCH QUESTIONS

- How can an application for Danish children, whose parents are physically absent, be designed and developed?
  - What features should the application provide in order to fit the situation of the child?
  - How should the application aid the parents while still addressing the child's needs?



## 2. RELATED WORK

Relevant theories and concepts, along with studies inside the project domain will be covered in this section. Furthermore, the existing tools and printed material from Forsvaret will be presented, all of which was important both for forming an overview of the situation that military families are in, but also, and more importantly, for guiding the first design phase.

### 2.1. CHILD-COMPUTER INTERACTION

According to Read and Bekker (2011) Child-Computer Interaction (CCI) is the “study of the Activities, Behaviours, Concerns and Abilities of Children as they interact with computer technologies, often with the intervention of others (mainly adults) in situations that they partially (but generally do not fully) control and regulate” (p.2). Much work has been done in this area of research with the aim of designing new and different ways for children to interact with and communicate through technology. This branch is born from the field of Human-Computer Interaction (HCI), both trending on creating usability through multidisciplinary focuses like psychology, interaction and game design. Due to the multidisciplinary nature there can be a current lack of well-adjusted methods of research and development aimed at children (Read & Markopoulos, 2013), meaning that the field is continuously evolving and benefiting from new research.

The CCI community usually targets children between the ages 5 and 12, as they grow up using technology (Read & Markopoulos, 2013), and mostly excluding toddlers and teenagers. The current approach is recognising that children need technology developed specifically for them, as their needs are different from those of adults (Read & Markopoulos, 2013). One of the challenges mentioned by Read & Markopoulos (2013) is supporting family communication, and it is specifically fit in the development of this study,

where the design is expected to not only accommodate the child, but also include the family in the context (p.5). The design phases will therefore consider the child as the focus user, but also seek the family’s input in the development.

The child’s role in designing technology, according to Druin (2002) can be extended from user, to tester, informant, and design partner. Due to the implication of the family in this process, the children’s role will not be extended to design partner in this project as it can be argued if the child is the stakeholder, but they will still be treated as user, tester, and informant. Therefore, the child as user will inform the design through observations of patterns of activity and general concerns, through video materials and notes of the observers while being in the same room with the participants, resulting in qualitative data about “likes, dislikes, difficulties, and interest areas” (Druin, 2002, p.7). This approach can be considered narrow due to the limited input offered by the user, and the difficulty in correctly making assumptions about observed children (Druin, 2002).

Children as testers is offering the possibility of obtaining more specific data about the matter, regarding what exactly did the user like or dislike, but it requires the prior development of a prototype (Druin, 2002). Finally, the child as informant is the broadest choice. Informing the design this way is not limited to developing a prototype, because it can also include the children’s input regarding paper prototypes and sketches (Druin, 2002). This way the child can suggest changes and is empowered during the design process, but the ultimate decisions will still lay with the designers, offering the possibility of improving prototypes based on additional types of research as well. This approach begins the process by inquiring in the previous interactions of the users with existing technology (Druin, 2002), which will be the starting point of this study.

## 2.1.1 *Players, learners or users - PLU model*

The PLU model (Markopoulos, Read, MacFarlane, & Hoysniemi, 2008) refers to how the target group is assessed while developing and while evaluating a prototype. The model describes the children as either being Players, Learners, or Users (PLU). Every applications can incorporate considerations from all of the branches, but will ultimately have main development considerations according to one of them. Therefore, *children as users* will be the direction elected for the development of the project, together with its considerations mentioned by Markopoulos et al. (2008), which can be summed into:

- Children need an application that is very specific to their age.
- Children are not dependent on technology and will only use it, when it meets their high expectations.
- Children may not be aware of the content they learned.

## 2.1.2 *Child-parent communication*

In relation to CCI many studies have been conducted with focus on the communication between children and their parents. In *Globetoddler - Enhancing the experience of remote interaction for preschool children and their traveling parents* a thesis study by Modlitba (2008) a prototype, Globetoddler, was developed in order to support the communication between preschool children and their parents. The prototype features a sensor-equipped doll for the child, which is wirelessly connected to a smartphone application for the parent. The parent can record audio, video and take pictures and upload these for the child to see. The doll notifies the child about new content and encourages the child to look at on a computer or TV, see Fig. 1 for a picture of the computer interface, and if the child decides to do so, the parent will be notified about this. The child is also encouraged to upload sound, photo and video as well.



Fig. 1: Picture of the child's Globetoddlers interface (Modlitba, 2008, p.65).

The focus on the study was to increase the possibility of synchronous communication, as well as asynchronous communication through recordings, allowing the parents to see when their children are receptive to communication, and empowering the child to initiate in interaction. The prototype accounts for the different requirements of children and their parents by having two interfaces (Modlitba, 2008). The entire study is unique in its approach and has been inspirational for this project, with a focus on the children as initiators of communication and interaction. However, the targeted users are children of parents that travel, with Modlitba being inspired by a colleague on a business trip, where communication is enabled by stable internet connections, which is not the case for many military families.

## DESIGNING A COMMUNICATION TOOL FOR CHILDREN WITH REMOTE PARENTS

Dalsgaard, Skov and Thomassen (2007) made a study called *eKISS: Sharing Experiences in Families Through a Picture Blog*, in which they address three challenges for intimacy:

1. The parents found it difficult to achieve a continuing insight in the lives and wellbeing of their children while being separated.
2. When united after separation, the parents had problems understanding and relating to the experiences the children have had while being apart.
3. The children found it difficult to describe or retell the experiences they have had while being separated from their parents (p.68).

From these challenges they created eKISS, a weblog for supporting parent-child communication by sharing pictures taken with a camera phone as seen in Fig.2, while they are separated. The goal was to mediate intimacy and the study evaluated on results from four families finding that parents were able to engage in conversations about their children's day based on the pictures and gain a better understanding of their children's experiences. Interestingly for this project, eKISS was shown to be most useful during longer periods of separation or when the child and parent live apart. For the children, eKISS gave them an easy way of sharing experiences with their parents, but even though they had a positive effect, using the system the children found it hard to find motives and remember to take pictures (Dalsgaard, Skov, & Thomassen, 2007).

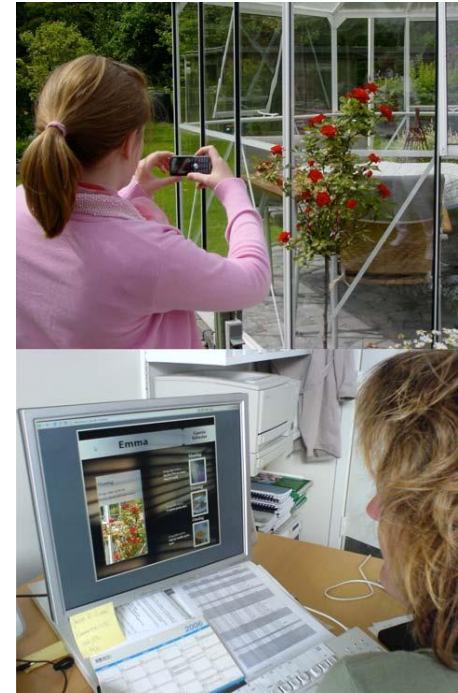


Fig. 2: Photos showing eKISS, above is the child taking a picture, below is the parent receiving the picture (Dalsgaard et al., 2007, p.70).

Yarosh and Abowd (2011) interviewed 14 families separated by work as part of their study in *Mediated Parent-Child Contact in Work-Separated Families*. The participants were traveling parents and their children between the ages of 7-13. The age group was chosen because they wanted the children “to be old enough to reflect on their own experiences” (Yarosh & Abowd, 2011, p.1186). The study found difference with studies conducted on parent-child separation because of divorce, as parents and children experiencing work-related separation are better at accepting non-optimal communication technologies, as well minimising long-distance interaction because of a shared understanding that a reunion will give them the



opportunity to catch up. However, for the eight military families they interviewed, only one was satisfied with amount of communication during deployment (Yarosh & Abowd, 2011, p. 1192). Additionally in work-related separation, the remote parent lacks control of their environment and structure of their time. As already noted network connection can be an issue, especially for military families, and constantly being required for a mission can put a strain on the communication scheme. Additionally, Yarosh and Abowd (2011) mention time-zone difference and limited access to communication infrastructures that adds to the challenges that military families face in terms of communication, which makes them resort to infrequently using mails, phone calls, and such.

Lastly, the study mentions that colour, images and animations are important elements to include when designing for children, as they use these for expressing themselves when using asynchronous messaging.

### 2.1. MILITARY FAMILIES

Everywhere in the world people are deployed by their country's military serving abroad. Some of these people are parents with a family and children at home. These situations are some which the military and other institutions and companies are trying to accommodate by helping the family understand the situation and to be able to keep in contact with the family member stationed abroad. Specifically children are targeted in a number of applications and games on the smartphone and tablet market. These applications seem to focus primarily on helping the children understanding the different emotions that arise during the situation, by use of mini-games, as in *Focus on the GO!* (UCLA Health, 2016), or through videos and reading on different related topics, such as in *Sesame Street for Military Families* (Sesame Street, 2016). These are just some examples of applications

developed for military families, however, in Denmark there are no native applications for smartphones and tablets targeting children.

Veterancenteret, as mentioned, are handling the relationship between the soldiers and their families, on their website different resources for supporting the soldier's relatives can be found. There are books and brochures for both children and parents, as already mentioned, with *Vi ses, far* (Rohde, 2015) a short story targeting 3-5 year old children and focusing on helping children describe their feelings, when they miss their mother or father. Similarly, *Min far er Soldat* (Skov, 2005) and *Vi si'r godnat til månen* (Haahr, 2012) are short stories that relatives can acquire from Veterancenteret during deployment of the soldier. There are many different brochures, both for teenagers, parents, but also for the children (Meyer et al., n.d.), but also informative pamphlets for both the soldier going abroad and the relatives who left behind (Forsvarsakademiet, 2007). In *Når du sendes ud...* (Forsvarsakademiet, 2007) the situation that the soldier will be experiencing is described, and in *Mens I er væk fra hinanden...* (Forsvarsakademiet, 2007), the situation that the relatives are experiencing is described. In the latter the contact between the relatives and the soldier is covered, specifying letters, mails, phone calls, audio and video recordings, as well as drawings. In relation to this audio and video recordings, and drawings are said to be very appropriate for maintaining the contact between parent and child that children need (Forsvarsakademiet, 2007).

*Missionen går til...* (Høgsted & Bertelsen, 2008) is a different publication compared to the others, as it contains blank lines and picture frames, see Fig. 3, that relatives can fill out before, during and after the deployment, including the child as a user and creator. The publication provides exercises to aid children during the progression of their parent's deployment and absence. The tasks include creating time visualisation, drawing, and



## DESIGNING A COMMUNICATION TOOL FOR CHILDREN WITH REMOTE PARENTS

comparing pictures taken at home and at the location, where the soldier is stationed. Furthermore, parents and children are persuaded to create/choose a mascot that the soldier can bring, which is similar to Globetoddler, prototype (Modlitba, 2008).



Fig. 3: Picture of a page in *Missionen går til...* showing suggestions for pictures (Høgsted & Bertelsen, 2008, p.48).

On Veterancentret's homepage (Veterancentret, n.d.) there are also games for children such as *Camp Dannebrog* (KathArt, n.d.), where the player can get a sense of how it is in the Danish camp Bastion in Afghanistan, and *Virtual Camp* (Duck and Cover, 2014), where the user will actually be able to walk around in a virtual rendition of the actual camp and chat with other users. This proves that there are resources for children and parents to help them get an understanding of the place the soldier is at. However, none of these have been developed for smart phone or tablet use.

The official platform for communication between soldiers and their relatives is *Soldaterportalen* (Forsvaret, n.d.). It was made in 2009 by Forsvaret and the goal was to provide an easy and secure platform for communication between the soldiers and their relatives, with the possibility for both parties to create personal diaries and photo albums. The platform was made as a secure alternative to Facebook, Twitter and MySpace (Forsvaret, 2009). However, even though being secure, *Soldaterportalen* has a disadvantage compared to media like Facebook, which is that it does not exist as a smartphone application. Having it as an application would make it more accessible to everyone, especially children.

### 3. METHODOLOGY

This project adheres to a qualitative research paradigm, with focus on mainly qualitative methods for data gathering and treatment. The research design is constructed around an interpretivist approach with focus on understanding and designing for the user's experiences and requirements. In the following sections, this research design will be introduced with the methods relating to it and the effect of the chosen approach as well as ethical considerations.

#### 3.1. PHENOMENOLOGICAL STANDPOINT

In relation to the philosophy of science this project takes a phenomenological standpoint, which means that the focuses of phenomenology was used in order to guide the choice of methods for inquiry and analysis and in using them. Furthermore, it was used in accordance with the overall research design, which will be described further down.

Phenomenology draws on the work of Edmund Husserl, as well of subsequent work by Heidegger, Sartre, and Merleau-Ponty, according to Spiegelberg (as cited in Creswell, 2007, p. 58; Brinkmann & Kvale, 2015, p. 30), with a common ground being the interest in objects and events ('phenomena') as existing only in the conscience of humans and not independent therefrom. All presuppositions are cast away and there is therefore not one objective truth, but many subjective interpretations on what defines a certain phenomenon. The goal is then to make a shift from describing separate phenomena towards searching for their common or universal essence (Creswell, 2007, p. 58; Brinkmann & Kvale, 2015, p.31). Phenomenology based research therefore focuses on the lived experiences of several individuals, who experiences or has experienced a common phenomenon, with an example being grief, as it is universally experienced (Creswell, 2007, p. 57-58). The researcher then aims to enter these

individuals life world, in order to gain insights on how they see and experience phenomena (Brinkmann & Kvale, 2015, p. 32) In direct relation to this it is important that the researcher 'bracket' own experiences, thereby setting subjective experiences aside as much as possible (Creswell, 2007, p. 59-60), or put differently "attempt to place the common sense and the scientific foreknowledge about the phenomena within parenthesis in order to arrive at an unprejudiced description of the essence of the phenomena" (Brinkmann & Kvale, 2015, p.31).

In the context of this project, the participants experience separate phenomena in relation to a parent or spouse working abroad for certain periods of time, however, common for all participants is the universal essence of physical absence. Physical absence is in this report understood as the differing phenomena of being in two separate locations for extended periods of time, and more specifically as part of a work related task. Therefore, the phenomena of physical absent parents is common for the children of the families that participated in the research and design of this project's prototype.

The goal of this project therefore becomes to reflect on the users' experiences and understanding of their own situations and how an object, in this case an application, will be able to help them.

According to Moustakas (as cited in Creswell 2007, p. 79) the preferred form of data collection in phenomenology-based research is through interviews with individuals, and these then being analysed for significant statements, meaning of statements, themes of meaning and description of the phenomenon. Interviews is therefore the main method of inquiry used for this project, which will be explained in *Data Gathering*, but as documents are also sometimes considered (as cited in Creswell 2007, p. 79), the materials and studies mentioned in *Related Work* were used during *Phase 1* of the project. According to Polkinghorne, the preferred amount of

participants, when abducting a phenomenological approach, is 5 to 25 people (as cited in Creswell 2007, p. 121).

### 3.2. RESEARCH DESIGN

The overall research design in this project is the user-centered approach, which focuses on “active involvement of users to improve the understanding of user and task requirements, and the iteration of design and evaluation” (Mao, Vredenburg, Smith & Carrey, 2005, p.105). This approach values the users and focuses on design, which makes it ideal for designing applications. In UCD it is therefore crucial to engage potential user during the design and build stages of the development of a product (Markopoulos et al., 2008, p. 37). The degree of engagement is determined by the designers, however “user-centered design assumes that users will be at least considered but ideally consulted during the development process.” (Markopoulos et al., 2008, p. 45). For this project users were consulted during the design and their inputs were actively used to adapt this design and shape the development of the prototype.

Focusing on the users and their experience is key to understanding how the prototype in this project will affect the user's situation. That is why this project takes a user-centered approach to design, in order to focus on the user's preferences, opinions and experiences and from these establish requirements for the design and development of the prototype. This aligns with the goal of phenomenological based research, which have functioned as a guiding approach to supplement user-centered focus on the user's experiences. In addition, an important aspect in the design phases of this project is to retain the power of decision making at the disposal of the designers and researchers and not the end-users, while still basing the design decisions on the users through the creation of personas.

#### 3.2.1 Design Phases

Building on the principles of UCD, the structure of the project in terms of design and research was organised as iterative phases, where research and design melt together in order to form a prototype, which is analysed, evaluated, and redesigned, following the cycle, which can be seen in Fig. 4, as a skeleton.

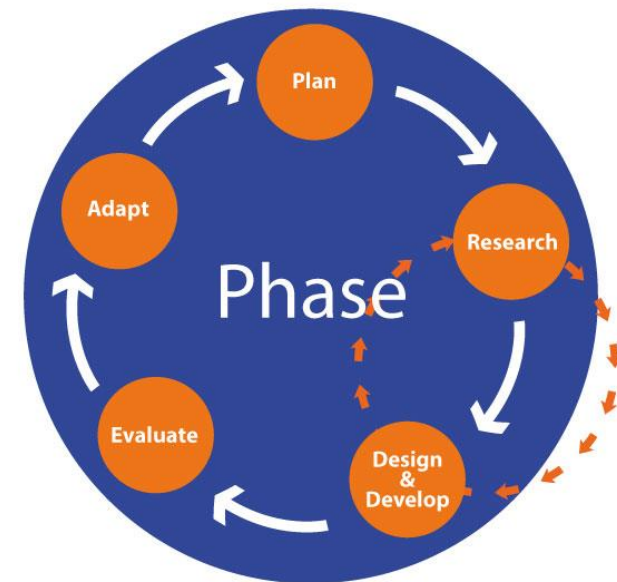


Fig. 4: Illustration of the iterative design cycle.

The first part of each phase is planning that phase, especially in relation to finding participants and gathering insights on them. This leads into research, which with the user centered approach is tied to design and development. In *Phase 1* a *Proof-of-Concept (PoC) prototype* was designed but never developed. This iteration of the prototype, was based on the material and related findings covered in *Related Work*, which was then evaluated with users and the insights gathered, subsequently adapted for the next phase. In *Phase 2* a *Functional prototype* was designed and developed based on the prior findings and additional research done in relation to these findings. Overall two phases were done as part of this project, leaving the door open for adapting findings and further developing the prototype in a Phase 3.

The data gathering is designed to consider both the development and evaluation of *Phase 1* and *Phase 2*. The purpose of the evaluation is to be an *Exploratory, Measurement and Experimental Study* (Markopoulos et. al, 2008), in order to support the evolutionary characteristic of the prototype. The goal of the product is to create a platform for aiding children with specific needs, and the goal of the evaluations is to gather a specific outcome. The outcome is achieved by setting predefined guiding questions to assist the researchers in creating the interviews, which in this case are both open and closed questions (Markopoulos et al., 2008). These questions are internal, are available only to the researchers, and are used to clarify what the data gathering should focus on. The questions will be listed in the *Interviews* sections of each phase, and will be answered according to the results. The methods and approaches associated with the interviews and questionnaires will be clarified in the following section.

### 3.3. DATA GATHERING

The methods, setup and procedure for the data gathering in this project is covered in the following. According to the phenomenological approach and focus on gaining insights on the users' experiences meant that interview was chosen as the main method of inquiry, including passive observations during the interview sessions, specifically for evaluating the application but in order to gather additional insights for the creation of personas, questionnaires were also distributed during *Phase 2*. These methods were elected in accordance with Markopoulos et al (2008), in order to yield results that can be evaluated and used to design the application as a functional prototype. The results will also be transposed into personas after each iteration, in order to guide the design process throughout the project.

The design of the evaluation sessions is adapted to the different types of users involved in this development. The evaluation is based on the criteria elaborated by Markopoulos et. al (2008), which fit the PLU model and the purpose of the evaluation:

**Usefulness.** The children will be using the prototype as a tool and therefore the relevance of the content influences how they benefit from the product.

**Learnability.** The target group is young and it can be difficult to engage in tutorials and training regarding the user of the prototype. Therefore, it should be familiar and intuitive and involve simple actions.

The evaluation of the first prototype, the *PoC prototype*, was designed around usefulness, while the *Functional prototype* includes the evaluation of usability and learnability. The focus is set on the results concerning the children, but without discarding the importance of the other users, the parents.



### 3.3.1 *Focus Group Interview*

As previously explained the main method of inquiry is interview, as this is routinely used to gather data about a phenomenon and focus on understanding the world from the point of view of the interviewee (Alvesson & Ashcraft, 2012, p.239; Brinkmann & Kvale, 2015, p.3). This ties with the phenomenological standpoint of this project, that is further established by conducting semi-structured interviews, in this relation known as semi-structured life world interviews, which comes close to an everyday conversation, where the interviewees are able to describe as freely as possible, but still assumes a purpose and involves a specific approach and technique (Brinkmann & Kvale, 2015, p.29-31). According to Lindlof and Taylor (as cited in Alvesson & Ashcraft, 2012) there exist five different positions for interview research, from which focus group interviews were chosen as the approach to interviewing the participants, even though the approach of narrative interviews with focus on storytelling would work well with the focus on creating personas (p.240-241). However, for data gathering in this project, focus group interviews enable the family as a whole to share their life world and lived experiences together, as well as putting consideration on not harming the children by having their parent(s) present to answer questions.

Normally focus group interviews contain 6-10 people (Brinkmann & Kvale, 2015, p.175), however, instead of following this structure and invite multiple families for interview sessions, each interview had one participating family in order to respect the intimacy and confidentiality of the family members' experiences. This does take away the possibility of amore deep and varied discussions on design solutions and ideas, but it will also mean that less strangers will receive insight or discourage the participants from sharing their feelings and understandings of the phenomena (Kandola, 2012, p.261), which subsequently respects the participants' wish for anonymity, and at the same time allows the family to share their more personal experiences. In

relation to this it is important to consider a significant downfall of conducting interviews with children, as children are affected by suggestions and leading questions, which can provide an unreliable view on the requirements and experiences of the child. Furthermore, it is important to use age-appropriate questions and to avoid long and complex questions (Brinkmann & Kvale, 2015, p.169-171), which is another reason for doing the interview with the whole family present. It should also be pointed out that the researcher can influence the interviewee, regardless of age, by using leading questions and in relation there is a chance, when conducting qualitative research, that the researcher detects problems or conflicts, where there are none (Silverman, 2013, p. 161; Brinkmann & Kvale, 2015, p. 29). This was an important consideration before, during and after interviews, the researchers' own presumptions were discussed beforehand and written down as notes during interviews as they presented themselves, effectively bracketing out these in relation to the phenomenological approach.

The focus group interview in combination with the semi-structured interview approach allows the interviewees to influence the session and the direction it assumes, which supports the phenomenological standpoint, but at the same time can reduce the researcher's control of the interview and produce long transcripts (Brinkmann & Kvale, 2015, p.176). Another aspect that supports the use of semi-structured interviews for gathering insight is that the questions asked are kept open and allow the recipient to interpret them how they want, and answer at best from their own experiences, which can help to further break down presupposed biases and to disprove hypotheses.

In the end it is important to understand that the researcher comprehends the central theme in the interviewee's life world, which means that the researcher is expected to register and interpret what is being said by the interviewee (Brinkmann & Kvale, 2015, p.32). This places a great deal of responsibility

of the researcher in terms of the interpreter of multiple meanings, and filter these in terms of the research.

Focus group interviews require high amounts of planning, communication and persuasion, in addition to skilful facilitation. Researchers have to inform participants of the purpose and the goal of the study, as well as why they have been chosen (Kandola, 2012, p.259-261). This is also done in order to maintain some control at the disposal of the researcher, which, in this project, was done by preparing guiding questions and structuring these on information about the participants being visited. These interview questions for both *Phase 1* and *Phase 2* can be seen in Appendix A, B and C. It is important to note that the interview questions were reconsidered after each interview, in relation to the new reflections and experiences learned from them. The planning and logistics of the interview sessions are also important to consider, especially when conducting focus group interviews with families, as the session has to fit in their schedule and the researchers', which in this project required flexibility in order to accommodate for a limited target group, where participants had to meet certain requirements. The choice of participants and how these were found will be elaborated on in each phase.

### 3.3.2 Evaluating the Prototype

As usability and learnability was elected as important points for evaluating the *Functional prototype* in *Phase 2*, the System Usability Scale (SUS) questionnaire was chosen as method for evaluation. The SUS was developed with the understanding that all usability is contextual and with a focus on it covering the effectiveness for users to complete a certain task, the efficiency in doing so, and the user's subjective satisfaction, through a simple ten-item likert scale (Brooke, 1996, p.189-191).

These ten items were translated in Danish and using a words and phrases that a child inside the target group would be able to understand. The questions

can be seen as part of the interview questions for *Phase 2* in Appendix C. The ten items were asked as part of the interview immediately after the participants had tried the application and taken at least one picture with it.

Besides the SUS items, passive observations were noted down and the interview sessions were audio and video recorded in order to yield results for the *Interaction Analysis*.

### 3.3.3 Setup & Procedure

As mentioned earlier, the logistics are important to consider, and for this project, it was decided to have participants have the last say in where the interview sessions should be set. Before each interview, a contact person was approached, and was given the choice between the researchers booking a room or setting the interview in the comfort of their own home. All of the contacted participants chose to have the interview set in their home. The contact persons were also in charge of setting forth available dates, where for example the whole family would find it convenient, and then the researcher would choose a date for the interview based on that.

As the participants decided the location of the interviews, the setup of the video equipment was dependant on the layout of the room, fortunately all except one participating family elected for a dining table. The aim was to position the video camera so it would be able to capture the facial expressions of all the participants, and for *Phase 2* it was crucial to capture their interaction with the tablet on which the application was running on. Moreover, it was important that the video camera was positioned at a distance from the table, where the researchers and participants sat, as it could otherwise attract attention and affect the participants' willingness to share information. As a precaution, an audio recorder was placed on the table near the participants in order to capture audio, in case the loudness would not be sufficient on the video recordings for the creation of the content logs for both *Phase 1* and *Phase 2*, respectively found in Appendix D and Appendix E.

In *Phase 2*, the participants would receive the tablet with the application already running, with focus on getting the children to try it. The observer remained close while the participants would test, in order to take notes and answer possible questions, especially during the testing with children. The participants were asked to try the application and see if they could take a picture with it. The purpose of this step is to establish if the anatomy of the application and user interface is interesting and easy to learn for the target group. This is an important aspect, as “*children are more likely to abandon a product that they cannot easily learn how to use*” (Markopoulos et. al., 2008, p.73).

During the focus group interviews, facilitation was very important and therefore a minimum of two researchers were present at all the interview sessions. One researcher assumed the task of note taking in order for another researcher to focus on facilitating the interview.

Observations were also noted down during the interviews sessions, with the interviews in *Phase 2* being the most important to note as these would eventually evaluate the usability of the application through the noted observations and interaction analysis, as well as the adapted SUS questions.

### 3.3.1 Ethics

Ethical considerations are very important in terms of research investigations, as it affects the participants involved (Silverman, 2013, p. 90). However, there are different perspectives to consider, such as how the research and also the interview session affect the participants (Brinkmann & Kvale, 2015, p. 84). According to David Silverman there are five principles one needs to be aware of, when conducting interview research (Silverman, 2013, pp.162-163). In the context of this project, all participants were contacted and asked if they wanted to participate in interview sessions. Exactly what these sessions entailed, in relation to the first principle, was explained to the participants beforehand, as well as clarified on the day of the interview, and

when inquired by the participants. As the interviews were conducted with military personnel and their families, the interviewees were asked for permission to video and audio record the interviews and the interviewees were told that the content would only be used internally in relation to this thesis. Along with the anonymity of the interviewees, they were also told that some questions would be personal and that they, at any time, could stop the interview or leave the session. It was furthermore ensured that any partiality on behalf of researchers or stakeholders, such as Forsvaret, did not influence the interviews.

### 3.4. DATA TREATMENT

Video and audio files were archived in a systematic manner, where it was easy to distinguish the phase in which the interview had been conducted and who was being interviewed. The video files were sorted into folders and labelled with a date instead of the family name. The actual names of the families were not used, instead new names were made for this report. Screenshots from the video recorded interviews will be presented in the design phases and these have been altered in order to keep the participants' identity hidden.

The first step for treating the data was to make content logs from the video materials, as this is considered the first step of analysis in *Interaction Analysis*, where segments that are deemed interesting for further analysis are noted down. (Jordan & Henderson, 1995). During the making of the content logs the researchers' notes were used for guiding the process. These notes include observations during the interviews, as well as the researcher's own presuppositions as covered in relation to the phenomenological standpoint, see *Methodology*. Starting time stamps were noted for interesting segments, which were at some point transcribed. Most importantly coding was kept free from predetermined analytic categories, as Jordan and Henderson (1995)

suggest, and with a focus on working on it as a group in order to reveal as many points of interest as possible and diminish idiosyncratic biases (p.43).

After this, the interesting segments and statements were looked through for meaning and thereafter themes or patterns relating to requirements and uses of the application, as well as the participants' experience of the application. Interaction analysis was done in order to notice interesting interaction with the application and study it in relation to the chosen foci. The end results from the analysis of the data are the personas, which will be presented as part of the evaluation of each phase.

### 3.4.1 Personas

Throughout the design phases of this project personas were developed. It can be argued that the types of personas developed for this study are formed from "The engaging perspective" (p15, 2012).

"An engaging description requires a wide knowledge of the users, and data should include information about the social backgrounds of the users, their psychological characteristics, and their emotional relationship with the focus area." (Nielsen, 2012, p.16).

This is a development that helps the designer empathise with the user by moving away from the stereotypical depictions and inquiring in the psychology and background story of the user. This means that the personas created will be based on the relationship they have with the family, and will guide the design phases through those relationships (Nielsen, 2012).

As the process of making personas involves fictitious elements it has been criticized by many scholars, as it "prevents the method from being regarded as scientific as one of the criteria for this is that the study must be reproducible"(Nielsen, 2012, p.17). These critics can, however be disproven as the process of making personas is a qualitative process that is used in the

interpretative paradigm, "*where science is understood as the object of continual clarification and discussion*" (Nielsen, 2012, p.26). To ensure validity of the personas the 10 Steps of Personas, as presented by Nielsen (2012) was followed, as these steps put emphasis on the detail of the personas (p.3). In general working with personas fits with the phenomenological approach, where the lived experience of the users is the focus, and where the researcher aims to gain a broad understanding of the life world of the users in order to construct the personas based on qualitative methods (Nielsen, 2012, p.5).

As personas are seen as a gathering of common points, the System of Coordinates was utilized. It is a qualitative method, which can be used to visualize the amount of personas needed in order to make a good representation of the users (Nielsen, 2012, p.40).

### 3.4.2 Interaction Analysis

For the analysis and evaluation of the video recordings *Interaction Analysis* has been conducted (Jordan & Henderson, 1995). This method assumes that knowledge and action are social elements that are situated in social and material ecologies. An important stance of the method is to investigate how people make sense of each other's actions as being meaningful, orderly, and projectable. It is particularly effective in settings with many actors that engage in technology mediated interaction, which makes it fitting for analysing the participants' use of this project's functional prototype in Phase 2 (Jordan & Henderson, 1995, p.79), which was the purpose of applying this method of analysis, in order to focus on the participants' interaction with the application.

In the method, there are different foci which can guide the analysis, called analytic foci, whereof two, *Participation Structures*, and *Trouble and Repair*, have been chosen for this project. *Participation Structures* deal with the ways that people make their engagement, or lack thereof, clear to the



## DESIGNING A COMMUNICATION TOOL FOR CHILDREN WITH REMOTE PARENTS

others when interacting, how do they gain entry and how do artefacts and technologies support or constrain these participation structures (Jordan & Henderson, 1995, p.68). *Trouble and Repair* is concerned with the occurrence of trouble in an activity sphere and how the different actors deal with the trouble and attempts to repair the situation, in terms of using verbal, bodily, artefactual, spatial and social resources. In the analysis, trouble will be most interesting, in terms of the human-computer interaction, or specifically child-computer interaction, where the children have to understand and learn how to use the prototype (Jordan & Henderson, 1995, p. 69-71).



## 4. PHASE 1

For the first phase of the design process, families where parents serve in the military were chosen as the main focus. The reasoning behind this decision was the fact that Forsvaret employs a varied range of individuals in a broad field of specializations, which makes the military representative for other types of professionals, whose jobs include frequent separation of one or more parents from their children. Other interests have already been highlighted, such as lack of control over the environment and time, as well as limited access to communication infrastructures and stable network connections. In addition to these, the added risk in comparison other jobs, where soldiers being stationed abroad in warzones face the risk of death, became a working hypothesis while researching the topic, in order to see how the added risk would factor into the situation and the participants' experiences of physical absence.

### 4.1. DESIGN & DEVELOPMENT

The materials covered in *Related Work* informed the first design phase in terms of design considerations. The different materials published by Forsvaret and the existing games and applications on the smartphone and tablet market, all seemed to approach the phenomenon in the same manner, in which these are tools to help children express their feelings with the situation. The approach of these were differing between text, videos and mini games, with text being both information for the child and parent, and short stories and e-books aimed at the child.

Amongst these, the publication *Missionen går til...* was chosen for inspiration for the application as it is meant as a tool and not only a piece of literature. The different features of the publication were in focus, such as the personal communication through photos taken by the children and their

parents, an important example, as also mentioned in *Related Work* in relation to the eKISS weblog. The eKISS raises a design consideration in terms of motivating the children to take the pictures. Furthermore the publication places the child as initiator and creator of content, a unique trait also found in the Globetoddlers prototype. Another interesting point in relation to the material was also that children would want to express themselves with colour, images and animations during asynchronous communication (Yarosh & Abowd, 2011), and that they prefer audio and video recordings, as well as drawings when communicating with an adult (Forsvarsakademiet, 2007).

These were all important findings that initiated the first design phase and lead to the hypothesised users.

#### 4.1.1 Hypothesised Users

Children of military families need more ways of communicating and interacting with their remote parent. Children of the age of 5-8 have a need for ways to express themselves, in this age group they prefer audio and video recordings and drawings over writing. This communication should be done in an asynchronous way, as connections can be lost, so communication through recordings created both by the parent and child is to be preferred.

For handling longer periods, children need to be kept motivated, so there should be tasks for the pictures and a visualization of time. These tasks should provide the children with interesting ways to express themselves, such as through images and colours, while also teaching them of the deployment. This could be done with mini games, e-books, videos and text. In order to create a bridge to the deployed parent a mascot has been suggested, with a photo album of the mascot in the area of deployment.

#### 4.1.2 Participants

From the *Hypothesised Users* and the focus on military families the participants for the first design phase was determined. Firstly, Varde Kaserne was contacted, and an interview was established, in order to gather insights on the specific field and receive feedback on the *PoC prototype*, as well as answering internal questions relating to the material by Forsvaret, which has been adapted for the hypothesised users. Present for the interview was a contact person and two employees working specifically with family contact and briefing.

In relation to the hypothesised user families, where one of the parents serves in the military, were sought out for participants that would take part in a focus group interview session, with the prospect of having more interviews later. The participants at Varde Kaserne directed the search for participants to relatives and contacts that they had, but in the end only one family volunteered for the interviews in the first phase.

#### 4.1.3 Proof-of-Concept Prototype

Based on the hypothesised users, the *PoC Prototype* was designed, in order to visualise the concept of an application, which incorporates the design considerations established in relation to the hypothesised users. *Missionen går til...* was a guiding template for the design, and the structure of the game was based on the popular Danish game *Pixeline*, see Fig. 5 for reference, as well as *Globetoddlers*, where the mascot appears in the interface and prompts the child to perform actions, and aid him/her during play.



Fig. 5: In-game picture of *Pixeline - Skolebøger* (KreaKids, 2016).

From *Missionen går til...* elements and functions were considered and sketched as part of the design of the *PoC prototype*. In Fig. 6 these elements can be seen together as they would appear to the user, and they include character (mascot), calendar, diary, photo journal/album and map.

- Mascot: In *Missionen går til...* there are two mascots, one that stays home with the child and one that follows the parent. In order to accommodate the game design to the *Pixeline* example, the prototype will include one mascot, which is magical and can dislocate abroad to the parent's location.
- Calendar: *Missionen går til...* presents custom calendars in order to visualise time. The prototype offers as a first step, a calendar that can be drawn upon, and is customisable with stickers.
- Diary: Also customisable with stickers, the diary is offering a personal feel to the application, which can be seen in Fig. 7.



Fig. 6: Visualisation of the PoC prototype.

- Photo album: *Missionen går til...* offers ideas of picture comparisons, when sharing images in a photo album, which can be viewed in Fig.8, like the bed in the camp versus the bed at home, other examples being the toilet or the bath.



Fig. 7: The diary screen with the smiley system.

- Map: Both incorporating information and play the map, in this case a globe, would transport the user to the country, where the parent is deployed, and in which mini games would be available.

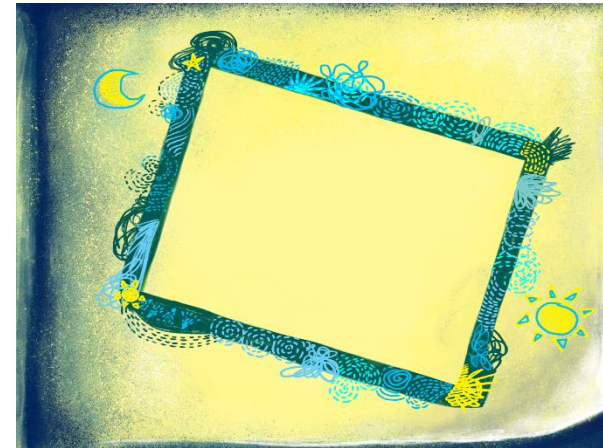


Fig. 8: The photo album screen.

## 4.1.4 Questionnaire

Through the meeting at Varde Kaserne Familienetværket was suggested as an entry point for gathering insights on the target group. A contact person at Familienetværket was contacted and asked to post the questionnaire, which can be found in Appendix F. This also served as a way to establish contact with military families for interview sessions, however no families volunteered and only a few people responded to the questionnaire.

The questionnaire contained a mixture of open-ended questions and closed questions, with the latter meant to establish the identity of the respondent, by asking the age, family role (mother or father), the age of the respondent's children, and the most frequent location for deployment. These questions would help pinpoint the demographics of the personas, while the open-ended questions factored into the life world of them.



### 4.1.5 Interviews

The stakeholders and target group participants were included in the development. A semi-structured interview was conducted at Varde Kaserne, due to the formal nature of the setting and the limited amount of time offered by the stakeholders. Additionally, a semi-structured interview was conducted with a family, referred to hereafter as the Carlsen family, where the children were currently older than the target group for this phase, however both children had experienced the deployment all-through the age 5-8. Both the session at Varde Kaserne and the session with the family have been designed to answer the following guiding questions:

- What are the current military social support materials?
- Are these materials used and useful?
- What are the needs of the families?
- What are the routines of the families?
- How useful is the prototype?

## 4.2. RESULTS

In the following section the results from the first phase are summarized as answers to the guiding questions.

### 4.2.1 Interview results

This section consists of a semi structured informal interview with the Carlsen family, where the father is often sent abroad working as a flight mechanic. The family has two children, a 10 years old girl and a 13 years old boy, and all of the family members were present. At the interview at Varde Kaserne, the representants all were part of families, and therefore fit the target group as users, as well as stakeholders.

The previously mentioned guiding questions have been answered in different manners, and elaborated towards new pieces of information, as noted below. The results are listed under Appendix G, after the content logs have revealed interesting statements, which contain meaning and experiences, they have been compiled into concise bullet points representing the interests of the family and the interests of Forsvaret:

- What are the current military social support materials?

Forsvaret picture gallery on the official website is the place where images are uploaded by a press officer for public access. This content is not personalised for the viewers. A more customised experience is available on *Soldaterportalen*, where the families can create accounts and receive information and official updates about the deployment. Additionally, the families receive personalised emails from Forsvaret with updates regarding the deployed parent.

Before the parent is sent out, social events for the families are arranged to encourage contact between the families of the soldiers. This is also the event where the families are presented with the different material provided by the military, to assist the families in the deployment period.

- Are these materials used and useful?

The mentioned materials are mostly used as initial support to help the families accommodate with their situation. Later on each family getting accustomed to the implications of a military parent, creates its own habits and routines.

As the prototype took great inspiration from *Turen går til...*, the book was reviewed at the sessions. The concept of the book was found to be liked by both families and Forsvaret, but they felt that it would work much better as

## DESIGNING A COMMUNICATION TOOL FOR CHILDREN WITH REMOTE PARENTS

an application, where the focus would be on communicating through pictures taken with the smart device.

- What are the needs of the families?

A safe and efficient communication system that will not provide additional stress for the departed parent. The application should not promise or encourage instant replying, like for example the popular feedback system used in instant messaging by applications mentioned during the interviews. An example is shown in Fig.9 below, which illustrates the WhatsApp receipt system.

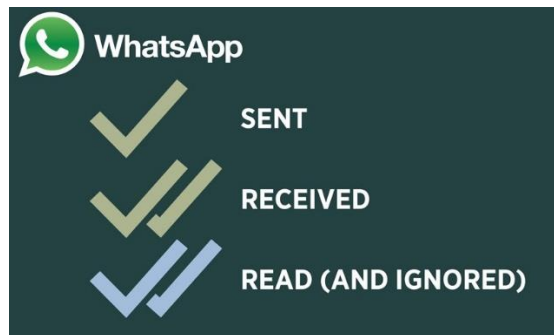


Fig. 9: Picture of WhatsApp's receipt system (Hughes, 2014).

All families need the application to contain pictures. Because different families communicate various types of information to their children, it is better to only include basic details about the place of the mission when handling the application.

- What are the routines of the families?

The families create their own Facebook groups and use it mostly for sharing pictures. The Forsvaret is concerned about the confidentiality implications of

these actions. Another consideration regarding pictures is that not all of the parents are inspired when choosing a subject, and this may influence the amount of pictures their children will receive.

The majority of the communication in the family is through phone calls, video calls, and picture sharing. Many families use video chat platforms like Skype and Facetime instead of phone calls, and communicate like this at least once a week.

- How useful is the prototype?

Most of the features offered by the prototype did not appeal to the interviewees, for several reasons:

1. It is not wise to base a product designed for children on interaction with text, mostly because it will exclude young children.
2. The calendar is a taboo subject, because all children ask about the period of the absence and all parents avoid making promises regarding it.
3. The diary may only appeal to girls, who will prefer a physical one instead.
4. Games expanding on the subject of military missions abroad are not a point of interest for the children. What they want to know instead is how the place looks, and therefore the focus is sending and receiving pictures.

### 4.2.2 Questionnaire results

Nine mothers and one father answered the questionnaire regarding military missions and their children. The parents reported about their children (a total of 20), out of which 13 fit the target group. 7 out of 10 parents leave for 6 months, and the rest for 3 months or less. The responses can be split into 2 areas of interest as mentioned below:

## DESIGNING A COMMUNICATION TOOL FOR CHILDREN WITH REMOTE PARENTS

### 1. Communication

All families communicate with the travelling parent at least once a week, and 6 out of 10 parents use Forsvaret publications with their children while the other parent is away. 8 of 10 parents communicate through digital pictures, 1 through pictures in letters, and 1 does not use pictures at all.

### 2. Content

The responses show that parents prefer to explain the parent leaving as a job that requires travelling, and that they do not elaborate on the job as being risky (1 out of 10 parents discusses the risk of death). 8 out of 10 parents inform their children of details about of parent's specialisation and its professional requirements, while 2 out of 10 parents prefer to explain the workplace only through the matter of the soldier's friendship and loyalty to each other ("they take care of each other", "they are friends", "they must help others").

8 out of 10 parents and their children use, and will use in the future, books and publications related to the military profession.

This phase presented a hypothesised user as preschool children, and a prototype developed for the theoreticised requirements. The development explored the potential lack of understanding children can have of the situation when their parent is professing in a dangerous field, far away from home for long periods of time. The *PoC prototype* aimed to explain to the children through various modalities, aspects of their situation that cannot be easily discussed.

From the results it has been clarified that children have a common knowledge about the parent's location, and that they can communicate to the parent often. It is also shown that the main source of distress is the period of absence and not the dangerous nature of the profession, as the children are

never informed about the risks. The children do not seem to suffer from lack of understanding of the unfolding events, but the presence of their parents is important to them, especially during occasions and holidays.

In the Fig.10 below, a summary presents the important findings of this phase. The next phase will focus on improving the communication between the travelling parent and the family.

Phase 1		
PoP Prototype	Int. Varde	Int. Family
✓ 5-8 years old	• Expand age group	• Facebook, Skype, Facetime, WhatsApp, Snapchat
✓ Adventure game	• Focus on Pictures	
✓ Mascot	• Keep Data confidentiality	• Pictures back and forth for events
✓ Pictures	• Needs low paced communication	• Military is a regular workplace
✓ Chat	• They use facebook	• Avoid time visualisation
✓ Journal		
Hypothesised user		

Fig. 10: Summary of Phase 1.

## 5. PHASE 2

The previous phase yielded strong results regarding the content of the prototype, and inspired the expansion of the target group as well. The features that did not present interest, like the diary, mascot, and calendar, were eliminated in favour of the main communication element, the visual images. As noted, the pictures are used as a way of communicating in an asynchronous manner, which is beneficial for the child as it does not build up expectations, and for the parent because he is not conditioned by the stressful responsibility of being available when he cannot.

All the gathered data needs to be interpreted towards the next design phase. The results grouped as common points, were elaborated into the following 2 new personas, which will guide the development of the application. The personas are for now focused on the two direct users of the prototype, the child and the departed parent.

### 5.1. DESIGN & DEVELOPMENT

As the results from *Phase 1*, showed no indication that military operations should be in focus, and that the actual need is placed in the longing of the parent, and the communication and relation between the child and the parent, new personas was made, targeting a broader user base, in order to get even closer to the potential users of this system.

#### 5.1.1 Initial Personas

This is Jonathan Hansen. He is 7 Years old, and grew up in a good family in a safe environment. Jonathan's dad travels a lot. He visits foreign countries where he has to stay for long periods of time. Jonathan misses his dad when he is not home. Jonathan's dad always shows him on a world map, where his destination is, so that Jonathan always can look at that and feel that his dad is not that far away.

Jonathan enjoys the pictures his dad sends him. And he likes to send pictures of himself to his dad. The only problem is that his mom doesn't always have the time to send his pictures to his dad. The application allows for Jonathan to send pictures by himself to his dad. And he like that he is now able to communicate directly to his dad without help from his mom.



This is Claus Hansen, he is 40 years old, He is happily married to his wife Maja, and together they have a son; Jonathan. Claus works abroad, and even though it is difficult to be away from his family he has a passion for what he does. He does his best to inform the family on what he is doing, and before every leave, he always shows Jonathan on a map, where in the world he is going.



Claus is really happy about the technical advances of our time, that he doesn't have to rely only on phone calls anymore, that he can send pictures instead, and even have video calls to his family.



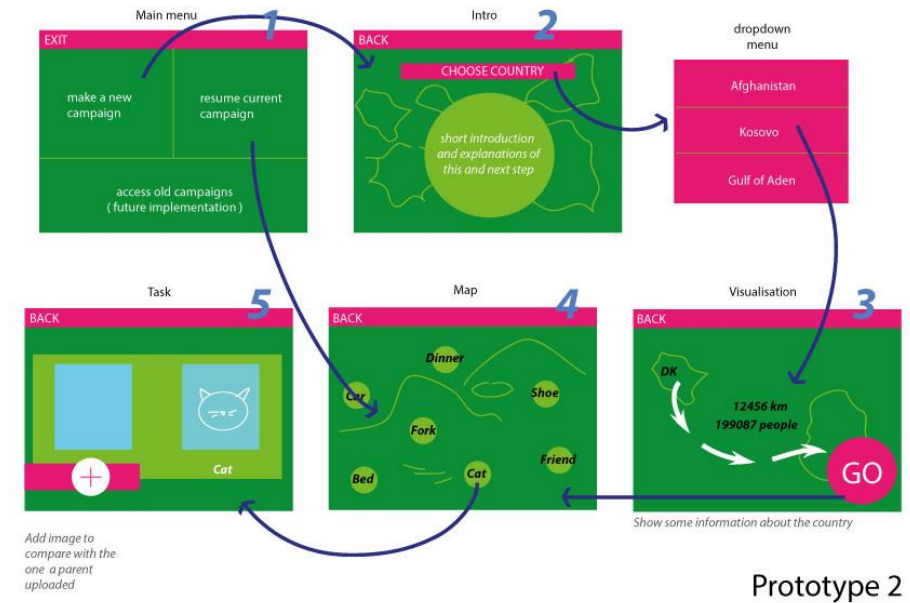
### 5.1.1 Participants

For the second phase of the project more families were sought out through posts on social media and with help from Familienetværket, through specific Facebook groups for relatives of soldiers. New questionnaires were sent out through these channels, with a short video explaining the application and a use example, as well as requesting volunteers to participate. This video incorporates the personas mentioned above. The families required for interview sessions and in this case testing scenarios were similar to the participants required in *Phase 1*, however, in the questionnaire a preference for the participant to live in the vicinity of Esbjerg was mentioned. The greatest difference was the age group of the children, which was expanded to 5-12 year olds and a focus on also seeking families with a parent working in any profession that requires separation for longer periods, which was adapted from the findings in *Phase 1* and was projected in the video accompanying the questionnaires.

### 5.1.2 Functional Prototype

Based on the findings from *Phase 1*, the formerly developed application based on a mascot, was changed to a tablet application featuring tasks based on picture sharing.

The *Functional prototype* (Prototype 2 in Fig. 11 above) was developed based on the adapted findings in relation to the newly developed personas. The prototype consists of predefined tasks of uploading certain images for the country where the parent is deployed, in order to help the families plan the activity ahead, keep the children motivated with a long term occupation, and give the parent inspiration for what to take pictures of. The visual style has been updated to fit the nature of the prototype and the age group. The tasks are inspired from examples mentioned in the interviews and in *Missionen går til...*, like comparing pictures of the toilets or the beds.



Prototype 2

Fig. 11: Sketch of infrastructure of the Functional Prototype.

The tasks are presented as a map, which can be seen in Fig.12 with icons that prompt the selection of appropriate pictures in each section. This format has been inspired from popular mobile and tablet games with scrollable maps, such *Candy Crush Saga* see Fig. 13 for reference.



Fig. 12: Map of tasks in the functional prototype.

## DESIGNING A COMMUNICATION TOOL FOR CHILDREN WITH REMOTE PARENTS

The users can add pictures from the gallery by touching the add button, which can be seen in Fig. 14 showing the screen for adding a picture of a friend, or they can access the camera by holding the same button. The help icon in the upper right corner explains these options.



Fig. 13: Promotional picture of Candy Crush Saga (Zahid, 2013).

The uploading screen adds informative text about the task, in order to ensure that the icon is not misinterpreted. Because the pictures may vary in size, the background attempts to dissimulate the discrepancy by not delimitating any margins to frame the pictures.



Fig. 14: Task with picture adding system.

Considering the target group, it is important how the Graphical User Interface (GUI) is designed, in order to ease the efforts of the young children. The Eight Golden Rules (Shneiderman & Plaisant, 2004) for creating user interfaces have therefore served as design considerations guidelines in designing and developing the GUI in the following manner:

1. Strive for consistency: The visual style of the game is homogeneous. The placement and shapes of the buttons that afford actions stay the same throughout the application.
2. Cater to universal usability: The design of the buttons suggests the different affordances in a classical and consistent way, where going back is signalled by a left arrow, and adding content is signalled by a plus sign.
3. Offer informative feedback: Due to the very limited set of actions available this rule has been postponed until gathering information from the evaluation regarding the needs of the users.
4. Design dialogues to yield closure: Additional explanatory information can be accessed through special buttons placed at the

screen of interest, which can be seen in Fig.15. The interactable buttons have short descriptions of their functionality.

5. Prevent errors: The interactable buttons are placed at a distance from each other to prevent accidental clicks. The buttons strive to illustrate their functionality clearly in order to avoid misinterpreted actions.
6. Permit easy reversal of actions: The prototype has been designed to afford a return to the previous screen from any accessed area.
7. Support internal locus of control: The prototype does not prompt any actions or messages unless the user triggers them voluntarily.
8. Reduce short term memory load: Considered as one of the most important rules regarding the target group, the prototype presents a simple and easy to understand flow. Apart from the finite number of actions that can be prompted throughout the application, each screen itself only offers a maximum total of 3 actions available.



Fig. 15: Information button.

### 5.1.3 Questionnaire

In order to expand the target group to families with children who are non-military, a short video was created to present the project and introduce the viewers to the online questionnaire, through an animated short story of a family using the prototype. The video is presenting a generalised situation of a family where the father, Claus as seen in the *Personas* section, travels often but without referring to any particular profession. This way the respondents can choose themselves if the story applies to their situation.

The questionnaire, see Appendix H, is designed to inquire on the current communication schemes and routines of the families with children, where at least one parent travels regularly, and the results will be grouped in relation to the responses of military families, in order to conclude how their situations are similar.

### 5.1.4 Interviews

As conducted in *Phase 1*, the interviews are gathering new knowledge and are based on open and closed internal questions, as listed below:

- Do they accept our personas and the situation presented in the video?
- What are the requirements of the users for the application?
- Are there new ideas for tasks?
- Evaluation with the children: Is the prototype fun to use?
- Learnability evaluation with children, by observing the number of questions asked and their proficiency with using the prototype: Is the prototype easy to use?
- Interview with the parents: Is the prototype useful?
- Interaction Analysis based on video recordings and observations.

## 5.2. RESULTS

In the following section the results from the 3 interviews with families, and the online questionnaire are summarized as answers to the guiding questions.

### 5.2.1 Questionnaire results

The online questionnaire gathered responses from 5 families of non-military parents consisting of 4 offshore professionals, 1 construction worker, and 4 military parents. The families related stories about a total of 15 children that fit the target group. 4 of the parents travel for 2 weeks every 14 days, and 4 parents travel for 6 months at a time.



The structure of the results is split into 4 categories, representing the nature of the communication being initiated during the departure, the content being communicated, details about the children, and finally, reactions to the application as presented in the video production. The responses of the military families were very similar to those recorded in the results of the questionnaire from *Phase 1*, and therefore will not be analysed as they did not bring new data towards the persona forming.

### Non-military families

#### 1. Communication

2 families communicates daily, 2 families communicate every other day and the other 1 once a week.

#### 2. Content

4 families communicate through pictures, using Snapchat, Skype, and Facebook. The pictures are described as “everyday pictures”. One parent mentions that the children ask for pictures of the hotel and the food, but since they call on the phone daily, the pictures are shared when the parent gets home. This situation refers to a parent who travels 2 weeks at a time. One respondent mentioned that the family never considered the option of communicating through pictures, but they will consider it in the future.

#### 3. Children

The children are more communicative and try to take advantage of the time they can spend with the parent before the departure. During the absence, the grandparents are substituting the parent, and in 1 case the big sister.

#### 4. Application

All of the respondents, judged after the video production that the application is a good idea, fit for the children because of the simplicity. One parent mentioned that it is “a good reminder that communication can be improved” (own translation).

From these answers, and the fact that professionals from civil workplaces have chosen to complete the questionnaire because they could relate to the video material, it can be assumed that the situations of most families with children where at least one parent travels often are similar and have cumulative requirements. This means that the risk of the profession is not the decisive factor influencing the relations and communication, but the absence of the parent, which can be encountered in other types of professions apart from military.

#### 5.2.2 Interview results

The evaluation has been conducted with the family who participated in the development of the *PoC Prototype* and with two additional military families. The personas have been presented during the interviews and acknowledged by the target group as being valid. The findings are organised as each family member discussed and used the prototype during the evaluation. An example of an interview session can be seen in Fig.16 below:

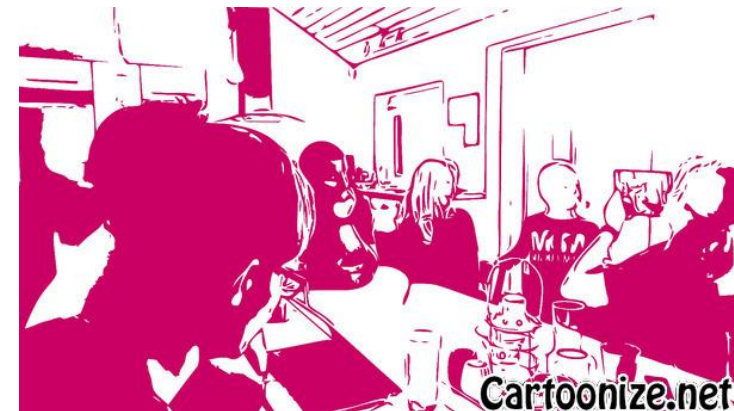


Fig. 16: Interview session.



### 1. The departing parent

- The application should never prompt instant replying. “One should not promise that he is available, as internet can go down”, “Why is mom not answering?” (own translation).
- It is good that the application displays one picture at a time in the task screen, because children take many pictures and it gets too crowded and confusing.
- Recording voice messages can substitute for bad connection in a phone call.
- Needs a customisable task to create if something interesting comes up.

### 2. The domestic parent

- It is important to see the face of the person you communicate with, because just words can be misunderstood.
- Interested in a form of diary because systematisation helps the children create a habit and ease the passage of time. “Have you sent a greeting to your mom today?”(own translation).
- Receiving physical mail is special and important.
- Applications for small children should not require them to have their own device.
- The application is simple and could include the grandparents in this process.
- Snapchat is added to the list of current tools, and video messages are mentioned
- Needs routines to help the children cope with the departure.

### 3. The children

- The most appreciated pictures are the ones including the parent.
- Physical mail feels like presents.

- The application must store the old pictures because they want to show them to their friends
- Taking a picture needs to be easier
- It needs to be usable without requiring reading for smaller children

The guiding questions can, according to the results, be answered in the following manner:

- What are the requirements of the users for the application?

The prototype should afford more types of media, like video, text and sound files. The families mentioned a need for video messages for a total of 42 times, and text being mentioned for a total of 43 times. It is also important to store locally all of the uploaded data, as some of the parents wish to update the tasks daily, and their children like to share the received pictures at school whenever they get the chance. This means that new content should not replace the old media permanently.

- Are there new ideas for tasks?

No. There are no ideas for new tasks to implement, but it is required to offer the option of adding and customizing own tasks when something interesting shows up.

- Is the prototype fun to use?

Yes. The limited number of buttons and the simple and achievable tasks like the toilet are providing fun to the children.

- Is the prototype easy to use?

No. The families mentioned difficulty in using the picture adding mechanism.

- Is the prototype useful?

Yes. The features are useful but should be improved with new additions in a further stage. The pictures are interesting to both the children and the parents, and the tasks are helpful for inspiration. It is good that the task system controls the amount of pictures uploaded, but it should afford custom content, and also store it for later access. Families also expressed their interest in seeing the application on the market in the future.

By approaching the responses through a System of Coordinates, the following personas emerged, representing 3 parents and 3 children.

### 5.2.3 Interaction Analysis Evaluation

The interaction analysis can be found in Appendix I. In the following summaries of the interaction analysis for each family is presented. The findings will be reflected in the upcoming *Personas*.

#### The Jacobsen family

When looking at the participation structure, the family sits close together and all pay attention to the tablet and application, as well as asking questions about it use and discussing it. Except for the son, who gets up from his chair in the start of the interview and goes around off-camera and plays with his toys. The mother interacts with the application the most as she takes it and suggests that her and the daughter can use it together, after the daughter has refused to try it. The mother thereby repairs the situation and at the same time invites to collaboration with her daughter. They collaborate on taking a picture of the father, and the mother also takes a picture of the son as seen in Fig. 17. During the interaction with the tablet the mother and father, as well as the researchers, explain how the application works and how it should be

used. An example being that the daughter asks “But now I have send it to dad?”, and then wondering how she can send a picture of her father to her father, which she ends with saying “I’m not dad!”, all the while the mother and father try to repair the situation by explaining how it works.



Fig. 17: Interview with the children at the Jacobsen family.

They all look at and gesture towards the tablet, when asking questions and referring to it, however the father is a little bit more in the background and does not use the application.

#### The Vestergaard family

The father and mother sit close to each other with the father having the tablet in both hands and on his lap and the mother sitting right next to him and interacting with the tablet, when he is not. The father goes through the

application and the mother mentions a story in relation to what the father goes into in the application. The mother takes the tablet from the father's hands and then talks about user scenario to be aware of referencing her daughter. There are three incidents where they require repair in order to continue using the application, the first one is a minor incident, with the second being a problem with a feature not yet implemented, and the third being problems with taking a picture, after which the father concludes that the application still needs some features added.

### The Carlsen family

The mother is looking from one tablet to the other as her son and daughter are using them and asks the most questions, while the tablets are being used. She prompts the son and daughter to talk and the daughter decides to take a picture with her and her mother together see Fig. 18.'



Fig. 18: Picture taken by the users with the functional prototype.

The son and daughter are looking through the application, but do not take any pictures before the researchers have repaired the situation by showing

them how to. They are all focusing on interacting with the application and they have it lying on the table during discussion and refer to features. In relation to another foci in interaction analysis, Artefacts and documents, the son uses an eraser that was lying around and takes a picture of that, he is the only one in the interviews to not take a picture of person, but instead of an object.

### 5.2.1 Final Personas

From the results of *Phase 2*, personas have been made. Based on the general answers from the questionnaire and the interviews, a System of Coordinates was made to analyse the amount of personas needed to give an optimal representation of the users, as seen in Fig 19. The conclusion can be seen below translated as 3 adults and 3 children personas.

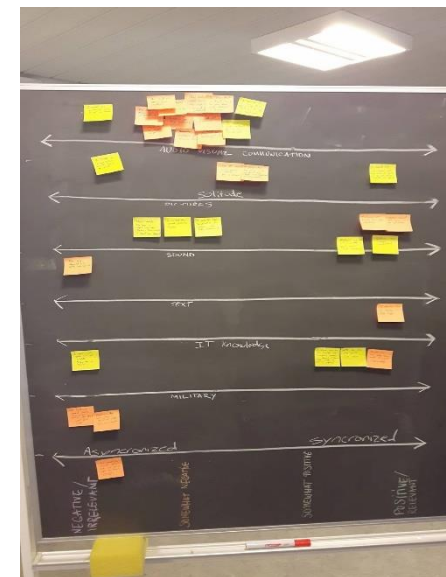


Fig. 19: Representation of parents visualized through System of Coordinates.

### Johannes Nielsen

This is Johannes, he is 37 years old, married and has 2 children; a girl of 8, and a boy of 5. He likes to feel in control, and wants to know what his family is doing. He is keen with IT, has the newest version of smartphone as he does not want to miss out on new functions. Whenever his wife or children have problems with their electronics he will be happy to help them out. His daughter has a bad habit of filling up her phone's memory with pictures and films, so he has to clear it often. As he would like to know what the family is doing all the time, he is happy when she sends him pictures, but sometimes it can be annoying, because he does not want the "fake" staged pictures, he would rather receive photos of natural situations. Every evening he gets a message from his daughter where she writes what she has been up to that day. He enjoys reading that, as the long period away from home can get very lonely.



#### Requirements for application:

- A diary, would like to know what they are doing
- A limit to the amount of pictures that will be sent
- There should be tasks connected to pictures, to avoid the "fake" setup pictures
- Voice recordings, and video recordings

### Kim Poulsen

This is Kim. Kim is 42 years old, married, and has 3 children, a boy of 11, a girl of 7 and a boy of 4. Kim likes to be with his family, but also enjoys the solitude that comes with being stationed abroad. His experience with technology is on a need to know basis, and only uses a phone when there is a purpose to it. He sends pictures home every once in a while, because his family would like to know what he is doing. He often finds it difficult to come up with new ideas as to what he can take pictures of, and then seeks inspiration in what his colleagues takes pictures of. The pictures he takes, he puts together in a document where he also writes a diary, that is send as a weekly newsletter for the family. When he calls home, he calls to let the family know that he is well, and that they should not worry so much. He would like to know when he should call home, because he does not want to disturb, or get rejected, because the family is busy.



#### Requirements for application:

- Guidelines to what kind of pictures are good for children
- An easier way to make a newsletter
- Newsletter specific for the different children would be good
- Shared diary, so that he knows what his family is doing
- Timestamps on the pictures, so that he can get an idea of when to make a call
- Should be simple and easy to use, not too many functions



### Lone Schmidt

This is Lone. Lone is married to Lars who is often deployed with the military. When Lars is away she considers herself a single mom, in the sense that she has to take care of everything. She has 3 children, and through them a very busy week. To avoid stress she plans her week as much as she can, and keep a tight schedule of it. Whenever she makes contact with Lars they plan when their next chat will be, so that he does not call and disturb her schedule. She likes the pictures Lars sends home, as they have a very positive effect on their children. She sends to Lars pictures of the children whenever she has the time for it. She does not like for the children to talk with Lars on their own, as sometimes the connection can get lost and then she will have to diminish their sadness, so she always supervises the communication between them.



#### Requirements for application:

- The application should be asynchronous
- The application should not have a lot of sounds
- A Diary where the child and dad can update each other
- Pictures are great for children
- Tasks for the children to do
- The application needs to be very simple, the children need to be able to use it alone.

### Children personas

Through the personas of the families, their relations and communication, and the stories told by parents in the questionnaire and interviews, we can begin to understand the personas of their children.

### Thor Skov

This is Thor. Thor is 5 years old, and grew up in a good family in a quiet neighbourhood. Thor's dad travels a lot, but that is okay as Thor likes to play around and has a great imagination, so he does not always have time, and often just wants to play until dad returns. Whenever they go to the airport to say goodbye to dad Thor is always occupied with looking at the huge aircrafts. He imagines what it would be like to fly in the skies. Sometimes Thor misses his dad and then he has a strong need to see his dad. Then he wishes that he could call dad or contact him, but if mom is not there he cannot do it. Thor enjoys when mom shows him the pictures his dad sends him. The best pictures are those where dad is sitting next to Ingolf, Thor's favourite teddy bear that dad took with him. But when his need to see dad is fulfilled, he would rather just run around and play with his toys.



#### Requirements for application:

- Should include sound as he cannot read
- Should be easy and hassle-free to use, as he bores quickly
- Doesn't need to be updated daily
- Photo Album

### Ditte Larsen

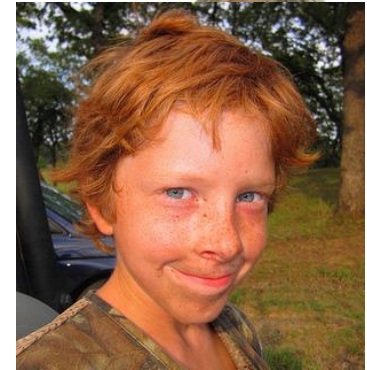
This is Ditte. Ditte is 8 years old, and grew up on a farm. She has a horse that she spends a lot of time grooming and riding on. She has won a few medals, and is really proud to show her medals to her friends and family. Her dad is traveling a lot through his work, so sometimes he cannot be there to see her in her competitions, and that is really tough. She wants to share all her wonderful experiences with him, and seek his comfort when something goes wrong. She understands that her father is having a job that requires travelling, but she does not like it. She wants him to stay home because she is very attached to him. When he is away she stay in touch with him by sending him a lot of pictures, she doesn't want him to miss out on anything, so often she has a problem that she runs out of space on her phone from all the pictures and videos she has recorded. Then she writes the last pieces of information in her diary instead, so that she can always remember what she could not show him, and include that the next time she talks to dad. Whenever she is sad and misses her dad, she knows that she can always turn to her trusted friends for comfort. Then they would make drawings together that they could send to her dad in the next mail they send. When dad sends her pictures she cannot wait to get to school to show the picture to all of her friends, because the picture he sends her are usually really funny, like pictures of a toilet or a big scary snake.

Requirements for application:

- Photo album
- Camera
- Small text status updates with smileys
- Sound recording for diary

### Dan Kristensen

This is Dan, Dan is 11 years old. When his dad is away he tries to fulfil his father's tasks at home. He tries to appear strong for his family, and doesn't want to burden his mom. Dan respects his father and his profession.



Dan likes to send pictures to his dad, mostly through Skype, and usually compliments the pictures with a bit of text. Whenever he receives a picture from his dad he shows them to his friends at school. His dad always shows him on a world map where he is going, and tell some weird facts about the country, Dan likes that, and is very interested to learn more. It is very difficult when dad misses out on important event, like his birthday.

Requirements for application:

- Photo Album
- Camera
- Video Sharing
- Fun facts about the country
- Messages

Fig.20 below is illustrating a summary of the steps followed in *Phase 2* and the afferent information collected.

## Phase 2

Prototype 2	Int. 3 Families	Questionnaire
<ul style="list-style-type: none"> <li>✓ 5-12 years old</li> <li>✓ Picture sharing application</li> <li>✓ Tasks</li> <li>✓ Travel info</li> <li>✓ Gallery</li> <li>✓ Comparison</li> </ul>	<ul style="list-style-type: none"> <li>• Add Video, Sound, Smileys</li> <li>• More intuitive picture menu</li> <li>• Control the amount of content</li> <li>• Add custom tasks</li> <li>• Store all data locally</li> </ul>	<ul style="list-style-type: none"> <li>• Include shorter periods of absence, like 2 weeks</li> <li>• Non military families use pictures as communication</li> <li>• Children of non military families behave the same regarding the departure</li> </ul>
Personas, Guidelines for features, Non-military focus		

Fig. 20: Summary of Phase 2.

## 6. DISCUSSION

The research design, methods and choices in this relation are considered and reflected upon in the following with regards to discussing alternatives to the research and design choices that could have led to different results.

### 6.1. Participants

The choice of participants could have been different, it was found that expanding the age group of the children would be better, and the families that were visited had children both in this age group and above it. It might have been interesting to follow Yarosh and Abowd (2011) and focus on children who could better reflect on their requirements, by only interviewing families with children between 7 and 13 years of age, as with the Carlsen family. However, this would also mean that the persona of Thor Skov would not have been created, and his need for the prototype might be higher than the rests'. It can be argued that since Facebook is an important mediator in this communication, the increase in the target group's age can imply a decrease of the prototype's relevance. Children reaching the age of 13 who will be allowed to use Facebook on their own will probably start directing their attention towards that, and the prototype will therefore need to compete with social media.

### 6.2. Interview

During the first interview, the most significant assumption was that the family would have a hard time talking about the topic of risks in the military. However, this turned out to be no problem at all, as the family freely discussed and answered the questions. Their reaction was not what was expected, which makes it important to highlight that, although the interviews

were based on a phenomenological interview stand, having own presumptions and experiences noted down made it possible to distance the researcher's presumptions and the interviewee's life world. It is still important to add that this means that we, as researchers, have affected the interviews, but being aware of this and striving to keep own presumptions separate from the interviewee's life world diminished the influence.

As shortly mentioned the Narrative interview approach (Alvesson & Ashcraft, 2012, p.241) would have been a fitting alternative to the focus group interviews that ended up being the leading method for data inquiry in this project. This approach could have enabled more personal experiences, as the participants would be interviewed individually, which consequently makes it more suited for gaining knowledge on individual's experiences and thereby looking into the user's life world. It would, however, mean that the dynamic in the family would not have been recorded, and this was a point which was noted both in the *Interaction Analysis*, but also in relation to the personas, which would have been shaped differently without the relationship aspect that was found during the focus group interviews.

For the procedure of the interview sessions in *Phase 2* the plan was to have the children try the application on a tablet each and have them answer the adapted SUS items immediately after. However, in practice only the Carlsen family, where the daughter and son tried the application on a tablet each, ended in following this procedure. At the interview with the Vestergaard family, the children were not present because of miscommunication between the researchers and the contact person of the family. At the Jacobsen family the son was only seated during the beginning of the interview and then ran around and played with his toys from there on, and the daughter only wanted to use the application after her mother picked up the tablet and started using it with her. This clearly shows the disadvantages of doing focus group interviews and conducting interviews in general. A solution could have been



to assume a structured interview approach (Rogers, Sharp & Preece, 2011, p.229) in the *Phase 2* interviews instead of a semi-structured approach, as this would have emphasised control on the researcher's part and regulated the structure of the interview. In some way it can be argued that the SUS items were asked in this way for the interview sessions, however they were adapted for being used as part of the interview and subsequently adapted as part of the ongoing changes between each interview sessions, where the interview questions were reconsidered and discussed.

## 6.3. Evaluating the Prototype

When adapting the SUS items to be used for evaluating the prototype in *Phase 2*, the *Funometer* model (Markopoulos et al., 2008), where children can answer the statements by marking on paper how much they lean towards an answer, was looked at. The *Funometer* provides smileys to explain the two options, separated by an empty block, where each centimetre represents one point on the scale. The purpose of this step is to ensure that the system will support the children's fun with the product, and not prevent it due to lack of usability (Markopoulos et al., 2008).

However, instead of smileys, thumbs up and a thumbs down were utilised at each end of the scale to represent “Strongly Agree” and “Strongly Disagree” respectively. The reason for this was that the phrasing of the questions in the SUS. Some points are formulated with a negative statement, which when answered e.g. with “Strongly Agree” does not fit with a happy smiley. In this example the original SUS question “I found the system unnecessarily complex”, does not fit the scheme of smileys as they evoke emotions, where the “Strongly Agree” is equal to the happy smiley, but agreeing strongly with the statement would not equate to a happy smiley. Instead a thumb up or

down is relatively neutral in emotion and can fit all of the different statements in SUS points, while still being fun for the child. An example of an SUS item adapted to a funometer can be seen in Fig. 21.

In the end this approach was abandoned after the first interview during *Phase 2*, where the daughter in the family did not initially want to try the application, prompting the mother to take over, which changed the structure of the interview and meant that the parents filled out the SUS items together with their daughter. For the following interviews it was chosen that the SUS items would be incorporated in the interview as questions following the testing of the prototype, as explained in *Evaluating the Prototype*.

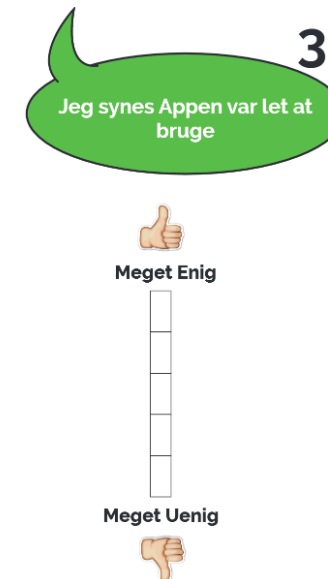


Fig. 21: Adaptation of the SUS to the Funometer system.

During the interviews, it was noticed that the parents in both the Carlsen and Jacobsen family assumed the role of facilitator and helped the researcher with clarifying questions for the children and assisting the flow of answers from the children by asking them questions and bringing up situations that the researcher could not have. This did mean that the researcher was not always in control and at times a parent would take over and complete a questions if no answer was given by the children. In retrospective this turned out to work during the interviews and support the semi-structured focus group approach, instead of breaking the control and structure completely.

Testfairy (n.d.) for Android is a software we could have used to have the participants test the application without the need for researchers to visit the participants. This could have opened access to a higher number of participants and possibly more data gathered, but in return would have limited the details and observations obtainable by physical presence, which are so important when gathering qualitative data. It is arguable that this method would have been optimal, as the preferred number of participants, as mentioned in *Methodology*, has already been met by using the current approach.

It would nonetheless be interesting to offer the prototype as in a real life scenario, where the participants download the content and use it in the comfort and privacy of their own home, at their own pace, and not mediated through researchers. This would also offer the possibility of testing the product in the field with a travelling parent, but ultimately require long periods of testing, depending on the duration of the departure.

### 6.1. Research Design

Participatory design was considered as a research design that could be coupled with the UCD approach, due to the focus on the users and their

added role of designer. However, participatory design is a very demanding design process which is hard to adapt into a small frame of time (Spinuzzi, 2005). Though it is possible to adapt the scope and size of participatory design, it would go against the wish to keep the designers in charge of the direction of the design and development of the prototype. Nonetheless, the input of end-users was valued highly and always informed the next phase in the design cycle as shown throughout this thesis and in relation to the emphasis on creating personas.

Another approach which also works with UCD is ethnographic fieldwork, which was also considered, as a specific field is visited and the user is observed in their natural habitat. However, ethnographic fieldwork goes in a different direction from phenomenology, by leaning more towards observation in addition to interviews (Steen, Kujit-Evers & Klok, 2007), which would be ideal for a long term study on the use and effect of an application, where the users are evaluated while using the application as part of their everyday life. It is worth noting that more time in the field with the users could have been spent with a focus on ethnographic fieldwork, which would still fit with a UCD and phenomenological approach, as the goal is to see a situation through the eyes of the end-user (Steen, Kujit-Evers & Klok, 2007).

Therefore, ethnographic fieldwork would also be usable in a future research scenario, where the application needs to be evaluated in use through observations in the field, which in the case of a military family would mean the deployed parent uploading pictures for the child to see at home on the tablet. This scenario would require a fully functional application, and that the soldier that the child participant communicate is actually stationed abroad, which introduces both organisational, ethical and planning caveats, such as gaining permission to invade the privacy of a family and gain insight on

highly personal experiences, as well as potential classified information, and so these would need to be considered for a potential design phase.

### 6.2. Personas and Scenarios

As stated in the Data Treatment section, personas are inherently subjective, even though a phenomenological standpoint has been taken and the researchers have bracketed out own presuppositions and worked in groups in order to avoid biases, this subjectivity cannot be escaped and bias cannot be fully avoided. This means that re-creating the personas is not possible. Seen as the scenarios have not been developed for the personas, they are not complete. Scenarios will have to be developed in order to make a complete evaluation of their viability, and thereby giving them any kind of scientific credibility. This project did however come up with personas and a description of requirements for a scenario, which could be made in order to address this issue in a phase 3.

It can be additionally argued that the sample gathered during the evaluation is representative for the target group. There is a chance that there are members of the target group that do not fit into any of the developed personas, which have not taken part of this study.



## 7. FURTHER DEVELOPMENT

The design phases have arrived through the iterative process at a new step in the process, which could be considered *Phase 3*. As the new phase marks the further development, it only includes a summary of the findings which can be used as a starting point. The overview of the developed phases and the direction of the further development is illustrated in Fig.22..

The results of *Phase 2* have brought forward the different needs of the users, as mentioned in *Related Work* (Modlitba, 2008). The adult and the child have different expectations from the application, and their needs will be elaborated below

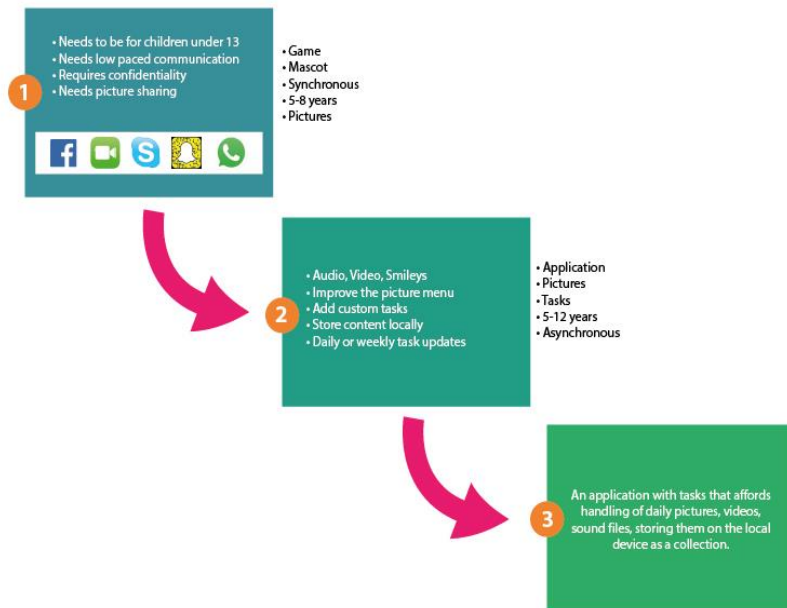


Fig. 22: A waterfall model showing the two phases with findings, leading into a Phase 3.

### 7.1. Child application

The next phase for the application should try to meet the new requirements of the latest personas. As Thor Skov cannot read, it is important to explain the affordances through icons. A prototype of the future improvements for the task screen where media is added is illustrated in the Fig.23.

This improves the discussed picture adding mechanism, and is basing the actions on more visual cues, eliminating the help button and hopefully the need for written information.

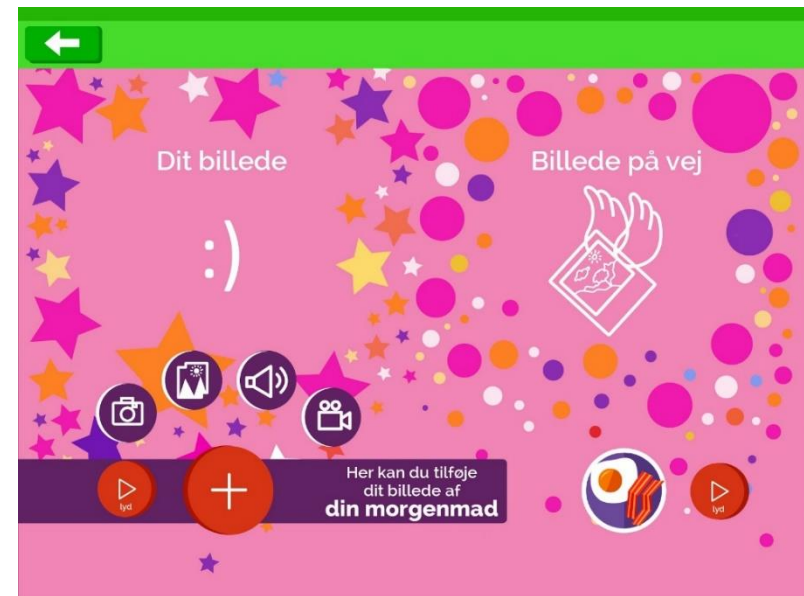


Fig. 23: Picture of the Photo menu with added functionalities.

### 7.1. Parent application

The application for the parent should contain a whole other set of functions than the child application, which was also noted as part of the findings by Modlitba (2008) for her Globetoddler prototype, which incorporated a



separate user interface to accommodate the parent. First of there is the security, feedback from the interviews showed that the parents would like to have an application with administrator rights for the child application. This would mean that the parent creates the account, administer what information should be visible or what country is relevant. As this is an application for parent it should contain more functionality, but as Kim Poulsen, is not too keen on electronics, the application still have to be simple. This could be worked around with a basic setup, and an advanced tab for more functions, so that Johannes Nielsen would still be satisfied. Furthermore this application should contain guidelines for new parents to work abroad, and a library of ideas of what to take pictures of.

### 7.2. Personas

As personas cannot be used without scenarios and this project ended before any scenarios were made, the personas only provide insights into the users we have investigated. The next step for this project, would be to apply the personas developed to a scenario linked with the concepts of the child and parent application described before. How would they use this application, how would they benefit from it etc. The Interaction analysis should be referred to when making this analysis. When the analysis have been made the designers will have to make design considerations based on the results, does the application need other features in order to meet the demand of the personas, and if acceptance is met, a new focus group session will be made, in order to gain acceptance from the users.



## 8. CONCLUSION

This report started out by investigating children with parents that serve in the military, but interviews showed that regardless of the profession, the relation between a child and a travelling parent has similar characteristics. As child experiences the deployment as just going away and the added risk of working in the military is not playing a significant factor in the participating families' reflection on their life worlds. This was compared to questionnaire results from families of other fields that showed similar problems as the military families. Physical absence was assumed to be the common essence related to the phenomena shared between children and their physical absent parents, and in order to accommodate this an application was developed. This application addresses the communication related issues found in the families.

When engaging the family members in communication, using pictures as a tool is a good mechanism that requires developers' attention. The tool needs to be considered as an asynchronous system that will not pressure the parties in taking actions at any time, but will provide tasks that can motivate users to contribute and create content, and position themselves as initiators of interaction and communication. These tasks also serves as an inspiration for the parent, as some parents require guidance during the communication. Apart from the pictures, asynchronous communication can be achieved through different types of media, as long as it can be sent as a message and be accessible at any point in time. This means that past events do not lose importance, but mark key moments in the child-parent communication. Therefore, it is of essence to store these moments so that the user is able to relive them anytime needed.

Communication through media is important for children because it enables them to see the adult's world through images. In order to keep the liveliness

of the communication, it is advised to include video messages and sound files as types of affordable dialogue. These features provide not only uniqueness that marks the special moment of bonding with the parent, but also allow the parties to express important details such as mood and spontaneous bursts of emotion. The important emotions can be sustained additionally by smileys and short written messages, for the moments when time or inspiration are not attainable. Additionally the age of the target children should be considered in order to create useful and learnable interfaces, audio feedback and help for becoming familiar with the application was suggested, even though the participating parents felt that their children would be able to understand and use the prototype application after being showed once.

The research of this report covers the two first design phases, but opens up for a third one, where the users will be identified through personas, and the ideal application will be developed. At the end of this report, guidelines for this last phase has been made for future work to pick up on.



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## DESIGNING A COMMUNICATION TOOL FOR CHILDREN WITH REMOTE PARENTS

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