Supporting Children's Self-Esteem Development Using Mobile Application:
Theoretical background and design of the user interface

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Abstract

The aim of the present thesis is to find out main supporting factors for children's self-esteem and examine how these factors can be design to a smart phone application interface. Literature search was done to get the overall understanding of theoretical background. Five adults and four children were interviewed using semi-structured prepared interview script with flexibility to further questions. The number of currently available self-esteem supporting applications were evaluated in various mobile application stores. Finally, a smart phone application interface was designed to focus on parent-child communication, valuable every day achievements, possible worries and giving positive feedback.

From the literature search we learned that some main supporting children's self-esteem factors are being present and giving uninterrupted time to the child, noticing and understanding positive and negative situations and emotions related to these, and giving positive feedback and encouragement. All interviewed parents agreed that good self-esteem is highly important, even essential, to a child. We also found that most of the parents were worried about their children's self-esteem and felt guilty of not spending enough uninterrupted time.

We found out that self-esteem supporting mobile applications designed for adult-child interaction are lacking. Therefore, a prototype of children's self-esteem supporting application was designed focusing on communication between the parent and the child, positive feedback and expression of emotions and turning negative situation into positive. It's feasibility and efficacy, however, remains to be evaluated in further studies.
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1. Introduction

What is my child like? What does he/she find interesting and important? What is he/she thinking when he/she is behaving like this? It is very important for child's mental development that some adult takes an real interest what they are really thinking and how unique they are. Through real encounters, the child will feel appreciated, being good enough and this will strengthen their self-esteem and help them to cope in everyday life.

Family life with children may not always be easy. Ordinary days can sometimes feel like a struggle where negative feelings take the space. In these situations the ability to be present and confront the child might be over shadowed. It is easier to notice all the negative things than the small and bigger positive ones that happen as planned. All these things leave a mark in child - in best case positive "I made it, I can do it!" feeling or a negative "I cannot do anything right!".

Every child will face some kind of challenge during their development. Nevertheless, the child should feel that they are good enough and that the challenges can be overcome together with their parents. The parents should help the child to notice all the small everyday achievements and courage the child when facing new challenges.

We are living in a world where everyday life is hectic and this often impacts the adult, filling their minds with upcoming tasks and appointments. The ability to be really present is affected. This is something that the child will notice. Those moments when adult puts everything else aside and really concentrates only on the child, are precious and will strengthen the child's experience being worthy.

The main purpose of this study is to see if we can design a mobile prototype that will help the caregiver to give a moment of undivided attention to the child and at the same time discuss the small everyday achievements and possible worries. Through these discussions, we hope that the child will feel appreciated, will learn how to deal with different situations and this will strengthen their self-esteem. To the caregivers this moment will give an opportunity to learn what the child is thinking, the possibility to guide and appreciate the child and at the same time strengthen the bond between them. The main focus will be on the caregiver and children under ~8 year old.

The aim is also to include a web site where the caregiver can get more specific information about the subject and also new ideas how the application could be used, but this will not be included to this thesis project work. This project will be done in a co-operation with child psychiatrics.

The main research question of this thesis is:

**Can we design a mobile application prototype for smart phone that could help caregivers to support children's self-esteem?**

To be able to answer the main research question, the following sub-questions need to be answered:

1. Do the caregivers really worry about children's self-esteem and would they appreciate an application as a help?
2. What are the needed functionalities for an application supporting children's self-esteem?
3. How would the interface of the application look like?
2. Background

2.1. What is self-esteem?

In today's world good self-esteem is seen as an asset and most of us want to ensure that our children grow happy because of this. That is why parents are ready to give time and effort to develop it. (Sinkkonen, J. (2008)) According to Sinkkonen, M. (2001) a person with good self-esteem likes him/her selves and is capable of performance that he/she is happy with. Usually person with good self-esteem is valued by others and in a difficult situation they seem to know what to do. Good self-esteem helps to find joy and happiness in everyday life.

According to Cacciatore, R. et al. (2009) child who has a good self-esteem "accepts her/him self as they are, knows what he/she is doing and achieves his/hers goals. Child is confident, open and gets along with others. The child trusts his/hers abilities and also knows how to encounter his/hers shortcomings. He/she has the ability to see him/herself as a positive totality, dares to be different and not be lead by others."

Both Sinkkonen, J. (2008) and Cacciatore, R. et al. (2009) states that experience of owns self-esteem is something that varies and changes daily and this is something good self-esteem should do - self-esteem is not the same day after day. Depending of the day we might feel really good and self-confident and then the next day totally opposite. When life is going smoothly we feel happy and confident, but when we face a challenge or a setback the feeling changes.

Sinkkonen, J. (2008) also mentions that in child's development peaceful and more rocky times varies. This also affects the self-esteem development - during more peaceful times the self-esteem seems to grow and when the child is going through more difficult times, this also effects the self-esteem negatively. There are roughly three stages of development in child's life where one period is left behind and new one is beginning- negative age (2-3 years old), six year olds and the teenagers.

2.2. How parents can support their children's self-esteem?

According to Sinkkonen, J. and Cacciatore, R. et al. especially the childhood years are very important for developing person's self-esteem. Children need safe and stable home environment accompanied by good parenthood. If the child does not find these things at home, they will try to find it from other adults. The adult who has the best opportunity and time, can give the child the needed attention. Even shorter encounters in good environment can help the child to strengthen their self-esteem. (Cacciatore, R. et al. 2009, Sinkkonen, J. 2008)

Cacciatore, R. et al. (2009) also mentions that to be present in child's everyday life is one of the most important things for the parent. To be able to hear and learn about the child's achievements and difficulties can be done only by being present and giving uninterrupted attention. Parent should accept the child's emotions as they are and teach ways how to express these emotions. When discussing with the child, the parent has the opportunity to tell them how they feel themselves, about their own emotions, and about their life and dreams. They should also support the child's own ideas and respect their point of view.

Cacciatore, R. et al. (2009) and Sinkkonen, J. (2008) emphasise that in hectic everyday life when it is more easy to notice the negative things, the parent should learn to see all the positive good things and successes that the child does and achieves. Through the positive the child's self-esteem will grow more
than only noticing the negative ones. If the child has done a mistake, the parent should give extra support. The role of the parent is to tell the child that everything will be ok and any situation can be solved.

Sinkkonen, J. (2008) mentions positive feedback and encouragement as a tool that parent should use to support the child's self-esteem, but only for the right reason. If the parent praises the child every time, it will become automated and the effect runs out. Instead of always praising "Good job!", the parent should show their interest in other ways, e.g. asking questions and giving more specific comments. Especially noticing the development and giving positive feedback on that will help to grow the child's self-esteem. "Over-praising" is also specifically mentioned e.g. on Today's Parent -web site (www.todaysparent.com).

2.3. Emotional availability

According to Biringen, Z. and Easterbrooks, M. A. (2012) emotional availability (EA) refers to a quality of emotional bond that is born between two people (parent and child) in social interaction. This concept is part of an attachment theory and was first introduced by Mahler, Pine and Bergman (1975). In their study they wrote about the supportive role of mothers towards their infants and importance of physical contact. Later on Emde, R. N. (1980) and Emde, R. N. and Easterbrooks, M. A. (1985) added the importance of emotional signalling and receiving to the concept.

Both positive and negative emotions, and reading these emotional signals are seen as very important part of EA. Biringen and Easterbrooks (2012) mentions the concept of sensitivity that was first introduced by Bowlby (1973) and Ainsworth, Blehar, Waters and Wall (1978). This concept describes the way the mother understands the signals and communications of her child and the way she responds to these signals. Emde (1980) also focused on the importance of parent being "available" and "present" in relationship between parent and child.

According to Biringen and Easterbrooks (2012) the difference between attachment and emotional availability is that the EA concept deals with both positive and negative emotions where as attachment mostly elicits from negative emotions (stress and fear). This affects the context of where these feelings can be observed. The EA emotions can be seen in different situations (e.g. play, home, laboratory) where as attachment basically in laboratory environment.

To be able to measure emotional availability, EA scale and assessment system has been introduced (Biringen, 1987). According to Biringen and Easterbrooks (2012) when observing the situations several coding can be done - facial expressions, vocal and physical signals and displays of both positive and negative emotions. EA is an assessment of mutual emotional awareness, perception, experience and expression (Biringen, 2005). In assessment there are four categories for adult - sensitivity, structuring, non-intrusiveness, non-hostility, and two for child - responsiveness and involvement. All these six categories are scored by using Likert scale (Biringen and Easterbrooks (2012).

2.4. Resilience

According to Fletcher and Sarkar (2013), there are multiple definitions and theories of psychological resilience. The term resilience is described in Wikipedia (2015) as "the ability to cope with change" and in psychological concept it refers to the "ability to properly adapt to stress and adversity". Leipold
and Greve (2009) refines the term as "recovering or avoiding negative outcomes from burdensome conditions".

Even if the psychological resilience has multiple definitions, Fletcher and Sarkar (2013) states that most of these are based on two main concepts - adversity (main antecedent) and positive adaptation (main consequence), and this is accepted by most of the researchers. The problem occurs when these two concepts are defined. Some researchers (e.g. Luthar and Cicchetti, 2000) see the definition of adversity as a situation with high risk and major disaster, whereas others (e.g. Jackson, Firtko and Edenborough, 2007) describe it as any everyday hard situation that has to do with difficulty. Positive adaptation is seen as "social competence" or "success to meet tasks" (Luthar and Cicchetti, 2000). According to Luthar (2006) to be able to show this, symptoms of well-being and the adversity or hardship confronted need to be appropriate.

According to Fletcher and Sarkar (2013) there is an ongoing debate if psychological resilience is seen as a trait or a process. When seen as a trait, list of qualities describing resourcefulness and inner strength (e.g. high level of energy, optimism, curiosity and self-esteem) is used (Block and Block, 1980). These are often called as "protective factors" or "promoting factors" that help a person to alter their respond to some difficult situation.

Psychological resilience can also be seen as a process that changes over time (Fletcher and Sarkar, 2013). This means that the way person responds (i.e. "protective and promoting factors") to some difficult situation alter from one situation to another. This is seen as an "ability" that develops to environmental interactions (Egeland, Carlson and Sroufe, 1993).

### 2.5. Summary of the supporting factors

In chapters 2.1 to 2.4 we have learned what is self-esteem, what emotional availability and resilience means and how the parents can support their children's self-esteem. To summarize, here are the main supporting factors.

First, the most important thing for the parent is to be present and give uninterrupted attention to the child. Through open discussions, showing real interest what the child is saying and feeling, the parent can support the child and make them feel important. This will strengthen the parent - child communication.

Second, both positive and negative situations should be recognized. It is easy to notice the negative occasions (i.e. when the child has done something "wrong"), but it is very important also to notice the small positive happenings and developments. When mistake has been done, the parent should give extra support for the child, help them to overcome the situation, and teach how similar situations could be avoided in the future (i.e. resilience). When something positive happens, the parents should always give positive feedback and encouragement.

Third, to strengthen the emotional bond (i.e. emotional availability) between the parent and the child, both positive and negative emotions should be recognized. Parent should accept the child’s emotions as they are and teach ways how to express these emotions.

In this study, the aim is to take these supporting factors into account and design them into the application.
2.6. **Human-Computer Interaction and self-esteem**

When searching Human-Computer Interaction (HCI) and self-esteem related publications, we noticed that available literature is very limited.

Jackson, L. A. et al. (2010) studied if technology usage has any impact on self-esteem. In their study they concluded that video gaming had negative influence whereas internet usage was seen as positive influence. In their study, "Children's Internet information seeking, life satisfaction, and loneliness: The mediating and moderating role of self-esteem", Liu, Ru-De etc. also found out that internet seeking influenced positively children's self-esteem through life-satisfaction and feeling of less-loneliness. They also concluded that children with lower self-esteem felt less-loneliness that children with good self-esteem.

Jackson, L.A. et al. (2011) also studied how information technology usage predicts children's future body mass index (BMI), body weight, academic performance, social self-esteem and overall self-esteem. They concluded that the IT usage did not affect on body weight, contrary to other study.

Gonzales, A. L. (2014) studied face-to-face communication versus text-based communication (e.g. Facebook, texting and email) and its effects on self-esteem. She concluded that even if most communications occur face-to-face, text-based communication was seen more important than meaning full face-to-face conversations. This tentatively gives positive hopes for digital communication in psychology.

When trying to find research publications related to emotional availability, literature search using keywords like emotional availability, emotions, designing emotions, displaying emotions etc. did not result any direct results. Closest article related to the present study is Doyle, J. et al. (2012) research about designing an application to support positive emotional wellbeing in older adults. In this study authors described the design process of an application that was targeted to supporting older adults in monitoring their health.

Several articles about robotics and emotions could be found, for example Kim, Y. C. et al. (2009) - Designing Emotional and Interactive Behaviours for an Entertainment Robot and Ahn, H. S. (2014) - Designing of a personality based emotional decision model for generating various emotional behaviour of social robots.

Related to resilience, Wisniewski, P. et al. (2015) studied "how online risk experiences impact teens, factors that contribute to or prevent teens from exposure to risk, as well as factors that can protect teens from psychological harm in spite of online risk exposure". From their conducted web-based online study, they found evidence that resilience is a key factor in protecting teens from experiencing online risks and it also neutralizes it's negative psychological effects.

2.7. **Mobile-health applications**

The International Telecommunication Union estimates that there are over 7 billion mobile subscriptions worldwide (May 2014) and according to Ericsson Mobility Report 4.5 billion mobile users (February 2014). Year 2013 was the first year when smart phones (~55%) outsold feature phones (~45%), but feature phones are still more used (Strategy Analytics, January 2013).

According to Statista in May 2015 there where over 1.5 million available applications for download for Androids and for iPhones 1.4 million. In summer 2014 there where over 75 million downloads in
Apple’s App Store. In March 2015 the most popular categories at the store were games (21.45%), business (10.14%), education (9.95%) and lifestyle (8.33%). Healthcare applications share was 2.27%. In recent years, there has been increasing number of mobile-health applications, varying from professional use to homecare (Liu, C. et al. 2011).

According to Statista (May 2015) mobile phones are widely spread around the world (around 4.5 billion phones), they are almost always been carried with the person, highly personal (e.g. pictures, videos, messages) and customized, and nowadays technically capable making them very attractive platform for health applications. (Klasnja, P. and Pratt, W. 2011)

Depending on the mobile phone, the technical capabilities vary greatly. Basic mobile phones can support only voice and text messages where as more high-end smart phones can have features like Internet access, cameras, sensors and support for mobile applications. Depending on the purpose of the health application, these different available technologies are being used (e.g. tracking health information, involving the health care team, social influence and adding entertainment). (Klasnja, P. and Pratt, W. 2011)

2.7.1. Self-help applications

According to Wikipedia (2015) self-help or self-help improvement means self-guided economical, intellectual or emotional psychological improvement. Self-help often includes publicly available information and/or interaction with a support group with similar interest.

Self-help improvement has spread out from books to mobile applications. There are vast amount of self-improvement applications currently available. These applications often include at least one of the following main functionalities.

**Setting goals.** One of the most common functionality in self-help applications is setting personal goal, e.g. losing weight. To achieve this goal, the process is often broken into smaller manageable pieces (i.e. habits), in weight loss for example eating and exercising, and this progress is monitored.

**Example 1. The Habit Factor**

This application leans on the idea of changing your habits, changing your life. The applications allows you to 1) set your goal and deadline and 2) create a habit that will support you to achieve this goal. You can track and monitor your habit and goal progress with the application.

Picture 1. The Habit Factor application (on the left)
**Social element.** Other commonly used functionality in self-help applications is the social element, i.e. friends, social community and/or support group. User will get support, encouragement and advices from other persons with similar interests. In some cases even competition / challenge between users can be used for motivation.

**Example 2. BreakUp**

BreakUp application uses the support group. With this applications you can impart and publish your relationship issues to other community members. Members of the community can respond and give an advice.

Picture 2. BreakUp application (on the right)

**Coaching and guidance.** Many of the self-help applications offer guidance and advices for a specific issue. They will help user to understand better their situation and offer specific actions to take to improve the situation. Applications can also focus on improving a specific skill, e.g. foreign language or math.

**Dealing with problems.** Often self-help applications deal with a specific problem or they try to help to recognize and/or give an different view to a problem.

**Example 3. My instant coach**

My instant coach is an application that provides help and advice for over 75 dilemmas - from finance to wellbeing. After selecting category, application will offer actions and give advice to make a decision to improve the situation.

Picture 3. myinstantCOACH application
2.7.2. Self-help applications for children

The amount of self-help applications offered to children is growing rapidly. Parents are interested to improve their children's emotional and/or physical skills, and are using self-help applications for this. These applications often use the same main functionalities mentioned in chapter 2.7.1. Here are some examples of self-help apps targeted specifically for children.

**Example 1. Calm Counter (emotional skills, age 5)**

Calm Counter is an application that will help children (targeted especially children with autism) to calm down using visual cues, counting backwards and deep breathing exercises. Children can either select a social story explaining how to use the methods in application or do specific calming down exercise.

This application deals with a specific problem and uses coaching and teaching as a method to improve the situation.

![Picture 1. Calm Counter application](image)

**Example 2. Project Noah (collaboration, age 10)**

Project Noah is an application that allows children to submit nature photos to help with the global research mission. Children can submit wildlife photos with labels or ask help from the community to identify the specie.

The application inspires the children to go out into the nature and explore. Children can also participate in ready-made exercises.

This application is a good example of social element being used as a functionality.

![Picture 2. Project Noah application](image)
Example 3. Alien Assignment (problem solving, age 5)

This is an application that focuses on improving problem solving skills and family interaction. Children are asked to help alien family to fix their spaceship by taking photos of objects that might help with the problem. The photos are then shown to the parents for some feedback.

2.7.3. Currently available self-esteem related applications

When using Google search, Google Play and AppStore to find out what kind of self-esteem applications there are currently available, some applications can be found (most of them targeting adults). Here are few examples of self-esteem related mobile applications:

Example 1. Self-esteem building guide (adults)

Self-esteem building guide is for learning how to boost and build better self-esteem. This application provides reading material under four different topics and includes related exercises.

This application uses teaching and coaching with exercises as the main functionalities.
Example 2. Happier (adults)

Happier is an application that promotes the positive things in everyday life. User can collect happy moments, post them on the wall and then share the happy moments with the positive community.

Happier is an example of social community application.

Example 3. Positive Penguins (children)

Internet search for finding self-esteem applications targeted for children was done, but the result was diminutive. After some searching we found an application called Positive Penguins which is designed for children 9-11 years old.

Positive Penguins is aimed for helping children to understand their emotions and the reasons behind those emotions. List of emotions is presented and using pre-made questions, the children are compelled to think why they are feeling as they are. Application also provides few games for entertainment.
2.7.4. Self-esteem related web sites

For this study internet search for finding self-esteem related web sites was conducted. Here are some examples where parents can find more information.

Developing your child's self esteem - Kids Health
(http://kidshealth.org/parent/emotions/feelings/self_esteem.html)

How to build your child's self-esteem - Today's Parent
(http://www.todaysparent.com/family/parenting/how-to-build-yourchilds-self-esteem/)

Helping your child develop a healthy self-esteem - Healthy Children

Building self-esteem: children 1-8 years - Raising Children
(http://raisingchildren.net.au/articles/self-esteem_different_ages.html)
3. Method

3.1. Qualitative interviews

To be able to answer the first research sub-question "Do the caregivers really worry about children's self-esteem and would they appreciate an application as a help", qualitative interviews were conducted with parents and their children.

3.1.1. Qualitative Research Methods

Qualitative research methods are said to be lower-constraint methods where the main purpose is to understand and describe the everyday life settings, i.e. to understand the decisions and actions of an individual. Instead of measuring and collecting numerical data like in quantitative methods, qualitative research methods concentrate more on words. The main methods of collecting data in qualitative research are observations, questionnaires and analysing conversations. (Graziano, A. M. and Raulin, M. L., 2013)

Often used interviews as data collecting method are either face-to-face individual or face-to-face group interviews. These interviews can be either structured (questions created prior to the interview with not much room for variation), semi-structured (interview guide created prior to the interview, possibility for follow-up questions) or unstructured (without structured interview guide). (Qualitative Research Guidelines Project, 2015)

3.1.2. Conducted interviews

The purpose of the interview was to gather basic information about participant's usage of 3rd party applications and their current feelings about children's self-esteem and related practises at home. The children were interviewed to see if they see things similarly to their parents. A total of nine interviews were conducted with five adults (four female / one male) and with four children (two female / two male). The adults were between 31-39 years old and children between 5-8 years old.

Each interview with an adult lasted around 20 minutes and with a child around 10 minutes. The interview sessions were conducted in Finnish and in different locations depending on the interviewee. The interviews were semi-structured with a prepared interview script and were flexible for interviewer to ask other following questions. Before the interview, the basic information about the study was given and written consent was requested (in child's case from the guardian) (see Appendix B). All interviews were recorded anonymously.

The interview questions are roughly divided into four main areas - the current usage of mobile devices and applications (e.g. what devices / applications are used, how often and with whom), feelings and possible worries related to child's self-esteem (e.g. importance, possible worries and information seeking), the current practises at home (e.g. praising and discussions) and their feelings about using an application as a help tool. See Appendix A for more details.

3.1.3. Data analysis

After interviews were finished, the recordings were transcribed to text format from audio. From the text keywords/phrases were coded and collected to separate notes. After this collected
keywords/phrases were first grouped to similar groups. After this the main findings were translated to English.

3.2. **Analysing the research literature, the interview results and the findings of the current applications**

To answer second research sub-question "What are the needed functionalities for an application supporting children's self-esteem", list of required functionalities for the application was created. These functionalities were gathered from the research literature (i.e. the supporting factors mentioned in chapter 2), from the interview results conducted with the parents and their children (see chapter 4) and from the currently available self-esteem related mobile applications (see chapter 2.7.2).

3.3. **Sketching the prototype**

To provide an answer to the third research sub-question "How would the interface of the application look like", interface of the prototype application was sketched based on the gathered functionalities list.

Prototype is an early version of the product that allows the designer to explore their ideas, show the features and functionalities of the product and the overall concept of the designed interface. Prototype can be from low-fidelity, i.e. paper prototypes, to high-fidelity prototype, i.e. prototype that can be clicked through. The benefit of using the prototype is the possibility to make changes easily and cost-effectively. (usability.gov, 2015)

In this study low-fidelity prototype, i.e. paper sketches, were selected as the design outcome. Ready-made iPhone paper sketch layouts were used as a base.
4. Results

4.1. Interview results

After analyzing and combining the findings, we found four main aspects. We also wanted to know how the parents feel using an application as a supporting tool.

4.1.1. Worry and feeling guilty

From the interviews one main aspect that could be seen is worrying about child's self-esteem. All the parents thought that good self-esteem is a very important, even essential to a child and they were willing to work for it. This finding is consistent with previous literature (M. Sinkkonen, 2001). They confessed that time to time they were worried about this issue and had tried to find out more information about it. Related books, internet sites and forums were the most popular information source for them.

- "Yes, I think about it [self-esteem] and I have been worrying about it a little bit also. I am sure some of the worries are not so relevant, I worry for nothing basically, but still...especially with the older one." (Adult participant 4)

- "Yes, with my two oldest sons I have been worrying about these issues." (Adult participant 2)

Cacciatore, R. et al. (2009) and Emde, R. N. (1980) stated that to give interrupted attention and to be present in child's everyday life is one of the most important things for the parent. All the parents thought that they had a feeling of not having enough time to concentrate on children and that they felt guilty about it.

4.1.2. Time spent alone

Using a mobile phone or tablet seems to be a time spent alone and not together as a family. When the children get more skilled using the devices, they start to play individually and not together with their parents. Only one parent mentioned that she watched some old photos and videos together with her daughters, but when they were e.g. playing a game, this was done without the parents. Maybe one reason could be that often the games and applications are designed for a single user (even the ones directed to children).

- "Usually we use them separately since the kids know how to play their games by themselves." (Adult participant 3)

- "We used to play together when they were smaller. But we do not do that anymore." (Adult participant 5)

- "I play by myself, I know how to do it." (Child participant 5, four years old)
- "Well, photos are something that we often see together...e.g. when we went to Korkeasaari and took some videos, we have been watching them together." (Adult participant 1)

- "I watch some videos with my mom, but usually I play my "horse game" by myself." (Child participant 1, six years old)

4.1.3. Rewards

As Sinkkonen, J. (2008) stated positive feedback and encouragement could be used as a tool to support the child's self-esteem. Parent's verbal praise was the most common way of acknowledging the child's good work, especially if this happened unexpectedly. For practising purpose, the sticker chart and small reward was used, especially with the smaller children.

- "Yes, when they were little...and actually we still have a reward system. For example at this moment the youngest has an issue with leaving the kindergarten, he starts to "fight" when we pick him up. If this goes ok, he will get a "smiley face" sticker and after collecting 10 stickers we will acknowledge this somehow. If they do something good unexpectedly, we usually just praise them verbally." (Adult participant 4)

- "Usually it is only verbal praising, we do not give "stuff" to them if they have done something especially good. We usually just tell them well done." (Adult participant 1)

- "Yes, we use stickers to award the children or for example some small piece of candy maybe. And of course the verbal praising." (Adult participant 3)

4.1.4. How to make them open-up?

The most difficult task for most of the parents is to get the children to talk, especially about negative situations. Some of the children keep their worries and emotions to themselves and only open up after some time. Dinner table and before going to bed at the evening seems to be the times when daily happenings are talked with the children. As Biringen and Easterbrooks (2012) mentioned, emotional availability, i.e. understanding your children's emotional signals, is a very important thing.

- "We discuss as much as they are willing to talk. For me it is quite easy to talk to, but it depends on them. If they stop talking then that is it. And if they do not talk right away at the first opportunity, usually they will start talking later on." (Adult participant 2)

- "We usually have to "dig" about the issues, they don't come easily to talk to us. It might take quite a long time (months even) before they come to us if we do not take the initiative." (Adult participant 5)
4.1.5. Feelings about the self-esteem application

We also asked the parents feelings about using an application as a supporting tool for children's self-esteem and mostly the feedback was encouraging. All the parents wanted to know more and were interested to try out the application.

- "Sounds interesting. If the application is good, I could see myself using it." (Adult participant 3)

- "Yes, I would like to try it out. If it anyway helps the children to talk more easily about things they are worrying, then definitely." (Adult participant 1)

- "I could try it out. We did use an application for bullying that we got from the school, and that was actually quite fun! " (Adult participant 2)

Some concerns were raised though.

- "If the child comes and starts to talk, I don't know if I would go and get the app at the middle of the conversation." (Adult participant 4)

- "I don't know if I would just take some parts of the application and use those." (Adult participant 2)

4.2. Functionalities of the application

After analyzing and combining the findings from the research literature, conducted interviews and the currently available applications, list of needed functionalities was created. The main functionalities of the application are:

Supporting parent-child communication. As we found out from the interviews, mostly the mobile devices and applications/games are used individually. In this study we want to design an application that will support communication between parent and child, and that the application could be used together. The idea is to create opportunities for the parent to ask questions and give guidance to the child, and this way help them to share their thoughts.

Positive happenings and emotions around it. One of the needed functionalities of the application is to notice often small but important positive happenings in everyday life. We also want to include the possibility to recognize and understand the emotions related to it.

Negative happenings and emotions around it. Same as in positive, we want the children to share their worries and negative happenings. Also in this functionality, recognizing and understanding emotions is important. We want to create a way to think what has happened, why this happened, how it was solved and how similar situations could be handled differently in the future (turn the negative into positive).

Positive feedback and encouragement. The application will also include functionality for giving positive feedback and encouragement.

Social elements, i.e. access to social media site (e.g. Facebook and Twitter) will be included to the application allowing parents to post "I am proud of my child" messages.
Coaching and guidance. Application will support the parent and the child through the exercises by giving guidance, e.g. ready-made questions and related web site with more information.

Dealing with problems. The aim is to recognize the problem / negative issue (i.e. what really happened and why) and think other way to solve the issue.

4.3. Design of the application

4.3.1. Mobile version versus main site

According to Jakob Nielsen and Raluca Budiu (2013), to achieve the best user experience, companies should design different sites for mobile devices (i.e. for feature phone, smart phone and tablet) and for laptop. Since this is almost impossible in most cases, the only realistic option is to design one separate mobile site from the main site. In their studies, Nielsen and Budiu (2013) concluded that the success rate of using separate mobile site is much higher and the usage more pleasant than when using the main site with mobile device.

Responsive web design (RWD) is one solution that can be used to tackle the problem of main site versus several mobile sites. In responsive web design the layout is targeted for easy reading with minimum resizing and scrolling, using flexible grid that morphs to the dimensions of the screen (Wikipedia, 2015). In other words, the site recognizes the used device's screen size and adapts the content according to this.

The other solution is of course developing separate mobile application. Nielsen, J. and Budiu, R. (2013) state that the user satisfaction is clearly higher when using mobile apps than main web sites. As a contrary, designing application in mobile phone results question of which platform(s) (i.e. iOS, Android, Windows and in the future maybe even Kindle Fire) to use? Nowadays even iPhone and iPad usually need their own versions and this is expensive.

When compared to full web site, mobile site design should only have the really needed features and functionalities, content minimized to main points and the interface elements enlarged to assure easier use. (Nielsen, J. and Budiu, R. 2013)

In this study iOS / iPhone has been selected as the starting platform/device because of its familiarity. In the future, we hope to include other platforms (i.e. Android and Windows) to our project. We recognize that the tablet could also be suitable device for our project.

4.3.2. Design process

This project started with a meeting with the child psychiatrics. In this first meeting the main idea of the application was explained and first discussion / brainstorming around the topic was done. The psychiatrics had an idea of developing a mobile application for supporting children's socio-emotional development and psychological wellbeing.

To get more knowledge about the main topics / requirements of the study, related books and research articles (i.e. children's self-esteem, emotional availability, resilience and HCI) where searched and read. To get the overall understanding of what kind of self-esteem related applications and web sites there are already available, internet search was done. The applications were roughly divided into groups by the theme.
To get better understanding of parent's feelings and attitudes regarding to children's self-esteem, small qualitative research interviews were conducted. After analyzing the recordings, the main findings were drawn.

Based on the discussions of the first meeting, read books and research publications and the main findings of the interviews, list of needed functionalities was created and first sketches were drawn. These sketches were shown to the other project participants and discussed. After this the design process was done iteratively, drawing more sketches based on feedback and brainstorming.

4.3.3. Final design sketches

Since the ground idea of this study was to try to tackle the issues related to children's self-esteem, it was comfortable to find out from the interviews that the parents truly worry about this issue. All the adult participants also mentioned the guilty feeling of not spending enough quality time with the children. Combining this with the fact that most of the participants told us that when using the mobile device they usually did this individually, we aimed to design an app that would support interaction and communication between the parent and the child.

Here are the main functions of the application explained in more detail.
Launching the application, creating the account, main screen and the icons

The application can be launched using the icon button on the main menu. On the first screen (see screen 1) user can either a) see the already created user account(s) (seen on the screen as a tree icon) or b) create a new account / tree for a child using the (+) button on the right upper corner. Every child will have their own tree with their name on it. When the account / tree is selected by pressing the tree icon, new screen with the selected tree in more detail is shown (see screen 2).

![Screen 1: user accounts / trees](image1)
![Screen 2: selected account in more detail](image2)

On the main screen (screen 2), there are three main icon buttons on the top of the screen. First, on the left corner there is a (back) icon button, second the (apple) icon and finally on the right upper corner, (acorn) icon button.

On a tree, the user can see the name of the child, positive apples created earlier, the nest of a squirrel inside of the tree trunk groove and the underground vole nest. Swiping the screen horizontally, user can check the older trees and happenings. These functions are explained in more detail below.

Positive happenings and emotions around it

As mentioned earlier, Cacciatore, R. et al. (2009) and Sinkkonen, J. (2008) highlights the importance of showing interest and noticing the small positive happenings in children's everyday life. Giving the child a moment of uninterrupted attention and discussing what has happened during the day is one of the main points tried to convert into the application design.

From the main screen (screen 1), selecting the (apple) icon button by pressing, the user will be directed to the screen where they can select either positive or negative happening (screen 3). If needed,
adult can select a child lock (petting the squirrel in right order) to prevent smaller children to enter and play with this feature (screen 2).
The other main point that we have tried to incorporate into the design is the emotional aspect. As mentioned earlier, both positive and negative emotions are part of the emotional availability concept. For a parent it is important to understand the emotional signals and communication of the child (Biringen and Easterbrooks (2012)). Cacciatore, R. et al. (2009) stated that all the child's emotions should be accepted and respected, and that the parent should try to teach the child how to express these feelings. In our design we have tried to help the child to recognize their own feelings and help the parent and child to talk about them and this way support their connection and understanding.

After selecting positive happenings (screen 3 above), the user will see a selection of situations (screen 4). These situations will be shown as an icon and with related text so that also the smaller children can "read" them more easily. User (child) can select the appropriate situation they want to talk about or if any of the ready made situations do not fit, select "other" option.

After selecting the situation and pressing the (arrow) icon button, the user (child) will see a list of emotions (again as an icon and with related text). From this list (screen 5) together with the parent, child can select appropriate emotions linked to the situation. Here are some examples of the emotions - happiness, sadness, fear, surprise, anger, disgust, amusement, contentment, embarrassment, excitement, guilt, pride in achievement, relief, satisfaction, and shame.

After emotions have been selected, pressing the (OK) button, will show the user(s) a question and hopefully give the parent and the child time to talk through why this situation / happening has been positive and also about the emotions related to it (screen 6).
After the discussion has been completed, using the (arrow) icon button, the user will see an apple where the selected situation (e.g. friends) and the emotions are shown (screen 7). This apple will then appear on the tree at the main screen (screen 1).

Screen 7: positive apple

**Negative happenings and emotions around it**

Cacciatore, R. et al. (2009) and Sinkkonen, J. (2008) emphasizes the extra support parents should give to the child when they have done a mistake. In this situation, the role of the parent is to tell the child that everything will be ok and any situation can be solved together. As found out through the parent's interviews, especially child's worries and negative situations seem to be harder to communicate to the parents. Child might even brood months before opening up.

As mentioned before, psychological resilience means the "ability to properly adapt to stress and adversity". Some researchers see resilience as a trait (i.e. quality that some people have), others as a process where a person reacts to a misfortune.

We have been trying to take negative situations, emotions and worries also into consideration when drawing the design. The idea is to try to guide the child (and the parent) step by step through the situation and hopefully help them open up to share their worries and feelings. At the end, we hope that the child will learn how they could respond to the situation in the future and turn it to more positive.
The beginning is the same as in positive situation. From the main screen (screen 1), selecting the (apple) icon button by pressing, the user will be directed to the screen where they can select either positive or negative happening (screen 2).
When selecting negative, the same list of situations and emotions will appear as in positive (screen 4 and 5).

Screen 3: list of situations

Screen 4: list of emotions
After emotions have been selected, pressing the (OK) button will show the user(s) more specific questions (screen 6). Again the idea is to get the child to open up and give the parent an opportunity to discuss about child's worries and negative feelings. The hope is that through these discussions, the child will learn why she/he felt bad and how this could be avoided in the future (turning negative to positive).

Pressing the (arrow) icon button at the bottom of the screen will start an animation. The idea is to give "reward" for the child. In this animation the vole will get different kinds of tools that it can collect and use (screen 7 and 8). After collecting e.g. 10 tools, there will be an extra award animation. After pressing the (OK) icon button (screen 8), the user will get back to main screen (screen 1).

I am proud of you!

As mentioned earlier, positive feedback and encouragement should be used to support children's self-esteem. Instead of using automatic "Well done" praise all the time, the parents should show their interest and give more specific comments. Especially noticing the development and giving positive feedback on that will help to grow the child's self-esteem. (Sinkkonen, J. (2008))

We learned from the interviews, that the verbal praise is the common way of giving positive feedback to the child. Also e.g. sticker charts are often used for practising purposes. In our design we have tried to include these features.
When pressing the (acorn) icon button on the right top corner of the main screen (screen 1), the parent will have the opportunity to give more specific feedback to the child and tell why they are especially proud (screen 2). After pressing the (arrow) icon button at the bottom of the screen, the child will be "rewarded" with an acorn animation (screen 3). The parent has an opportunity to share the proud moment also in social media (e.g. Facebook and Twitter) by using the icon buttons at the bottom right corner. Pressing the (OK) icon button, the user will be back in main screen (screen 1).
How many acorn rewards?

The child has the opportunity to check how many acorn rewards she/he has collected. When pressing the squirrels tree trunk groove at the main screen (screen 1), the child will enter it (animation). Inside the groove, the child can see all the collected acorns. We added a little exercise for the child and will ask them to count the acorns and give an answer. When pressing the text box, the keyboard will appear (screen 2 and 3).

Screen 1: main screen  
Screen 2: counting the acorns
After counting the acorns, the child can enter their answer (screen 3). If the answer is wrong, there will be a text/icon telling them to try again. When they succeed, the number will appear on the screen (screen 4). This feature can also be used as a "sticker chart" mentioned in chapter 5.3.4.

Screen 4: calculating

Screen 5: the right answer
How many positive apples and tools?
Hanging from the apple tree (screen 1), the child can check the positive apples that she/he has created earlier (see chapter 5.3.2). When pressing an apple, it will "open up" and show the selected situation and emotions behind it (emotions will be shown in colors) (screen 2).

Screen 1: main screen
Screen 2: positive apple

The same way the child can check the vole's tools collected earlier (see chapter 5.3.3). When pressing the vole's underground hole, they can enter inside.
5. Conclusions

Through the interviews and related research publications, we found out that the parents do worry about their children’s self-esteem and there might be an opportunity for this kind of application. We started with the related literature to find out what self-esteem actually means and how it can be supported in everyday life. We found out that some of the main supporting factors are:

- to be present and give uninterrupted attention to the child
- accept both positive and negative emotions, and teach the child how to cope with these
- see the child’s small positive achievements
- give extra support when mistake has been done
- give positive feedback and encouragement
- support the ability to cope with negative situations

We continued with small qualitative interviews, were we interviewed both parents and children. We found out that parents do feel guilty of not spending enough time with their children. We also noticed that usage of the mobile devices was done mainly individually. Verbal praising was the most common way of rewarding the good behavior or positive development. The parents worried about their children's self-esteem and were positive about using an application as a help tool.

After analyzing and combining the findings, were created a list of main functionalities for the application. First, the application should support the communication between the parent and the child, and should be used together. Second, the application should support positive and negative happenings and help to recognize and understand related emotions. Third, the applications should support giving positive feedback and encouragement. These functionalities were then designed into mobile application interface.

In summary, in this study we have tried to show how children's self-esteem supporting factors could be included into mobile application. Since the development of mobile technology has dramatically and permanently changed the way of communication within social networks, one of our aim with this study is to utilize the technology and use it as a communication tool between the parent and the child. The idea is that both - the parent and the child- could use the application together and when doing so strengthen the bond between them. We have designed functionalities for positive and negative happenings, tried to help them to recognize and understand emotions, created possibility to give positive feedback and tried to guide them through discussions.

5.1. Limitations

Since the interviewed children were quite young, it was quite challenging to receive valuable information. For the future, the interview with the children should be thought more carefully. Also larger sample size is needed to further verify our findings.
5.2. **Future work**

The next step for this project would be iterative user testing and designing. After the final design, the prototype should be created and tested.

A study to see if the application really helps to support children's self-esteem could be done in the future. We could ask the opinions and feelings of the users, but to get actual data that the application supports the self-esteem might be hard. The study would need a longer period of time and a process that shows the application is the reason for better self-esteem.

We would also like to test if this application could work in group settings, i.e. in kindergarten.
References


Appendix A - Interview script

Parents

1. Do you own smart phone and/or tablet? (If not, why?)

2. Have you downloaded any extra applications to your phone? If not, why? If yes, what kind of applications? How often do you use them?

3. Does your child know how to use smart phone/tablet? Does your child have their own phone/tablet? For what purpose do they use it (e.g. calling, texting, entertainment)? If not, why? If yes, how often? What applications do they use?

4. Do you ever use the phone together? If yes, when?

5. How important do you see a good self-esteem is to a child?

6. Do you ever think about / worry about your child's self-esteem? Why?

7. Have you ever read or found info about how to support child's self-esteem? If not, why? If yes, why, what kind of info and from where?

8. Do you ever have a feeling that you do not have enough time to concentrate what the child is saying? If no, why? If yes, why and how often?

9. Do you have a time when you just put everything else aside and you just talk with your child? If no, why? If yes, when and how often? What do you usually talk about?

10. Do you talk about positive / negative situations that has happened during the day? If yes, how often? How "easy" do you find this to do?

11. How do you praise your child when she/he has done something especially good? Do you have any extra awards? How "easy" do you find this to do?

12. Have you ever thought about using an application as helper for this? Would you be willing to use an application as a tool? Why?
Children

1. Do you know how to use smart phone/tablet? If yes, how often you use it and what do you do with it? Do you like it? (if possible ask them to show what they do / like to play with the phone)

2. How easy is it to use touch screen? How easy it is to understand the buttons etc.?

3. Do you ever use the smart phone/tablet together with your parents? If yes, when and what do you do with it?

4. Do you talk about what has happened during the day with your parents?

5. What do you do if something negative has happened?

6. Do your parents tell you "good job" if you have done something extra good? Do you get any prize?
Appendix B - Interview consent forms

**Interview Consent Form**

Name of unit ________________________________________________
Name of assignment__________________________________________

1. I agree to be interviewed for the purposes of the student assignment named above.

2. The purpose and nature of the interview has been explained to me.

3. I agree that the interview may be electronically recorded.

4. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.

Please sign below to indicate that you have read and you understand the information on this form and that any questions you might have about the session have been answered.

Name of interviewee_______________________________________
Signature of interviewee____________________________________
Date______________________
Interview Consent Form (Minor)

Name of unit __________________________________________________________

Name of assignment____________________________________________________

1. I agree to allow my child to be interviewed for the purposes of the student assignment named above.

2. The purpose and nature of the interview has been explained to me

3. I agree that the interview may be electronically recorded.

4. I understand that participation in this study is voluntary and I agree to immediately raise any concerns or areas of discomfort my child or I might have with the study administrator.

Please sign below to indicate that you have read and you understand the information on this form and that any questions you might have about the session have been answered.

Child's name _______________________________________________________

Your signature _____________________________________________________

Date ______________________