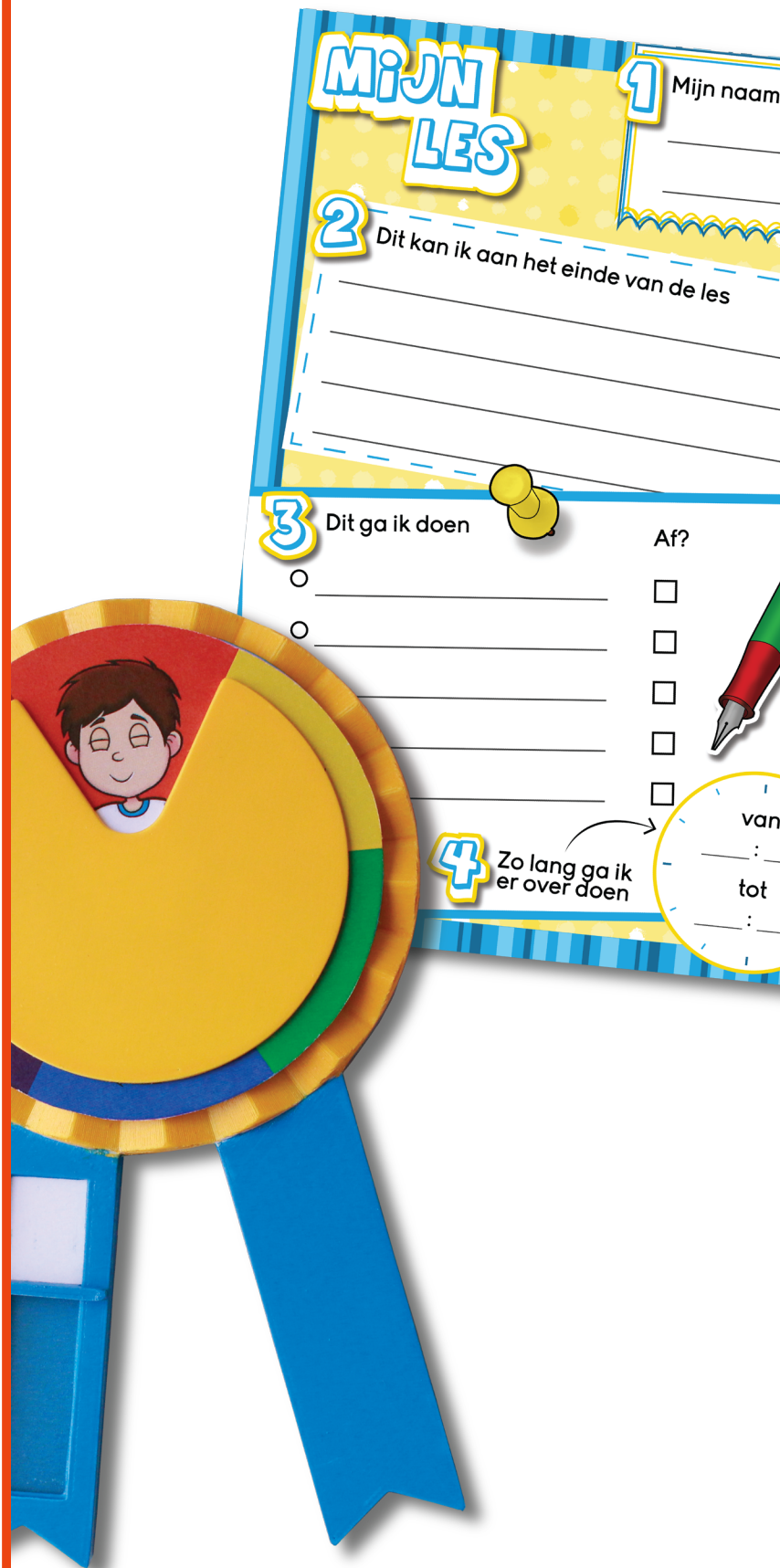


Appendix
Master thesis

**Improving the
school experience of
children with cancer**

Inge Bartels



Colofon

Appendix

Master thesis
Improving the school experience of children with cancer

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A Approach

Chapter 1.2. showed an overview of the used approach within this project. This appendix elaborates on the reasons for doing the different activities within the different phases.

A.1 Start up

During the start up phase a small desk research was conducted to gain the first knowledge about childhood cancer and the PMC. A desk research, which existed of reading several papers, articles and blogs of parents of a child with cancer, answered the first questions about childhood cancer and the PMC. Such as:

What is childhood cancer?

How is childhood cancer treated?

What is the aim of the PMC?

This knowledge was used to formulate the design brief and find a focus for the project: Improving the school experience for children with cancer at primary school. The results of this phase can be found in the introduction and analysis chapter.

A.2 Analysis

During the analysis phase more knowledge was gained by studying literature and conducting field research. The analysis phase existed of three parts: 1) Exploratory literature analysis, 2) field research, and 3) in dept analysis.

A.2.1 Part 1) Exploratory literature analysis

The first part of the analysis existed of a literature analysis. The goal of my project is improving the school experience for children with cancer. Within this goal there were still a lot of possibilities. Therefore the goal was to find an opportunity to improve the school experience. I choose to start with a literature analysis and visiting presentations (appendix B.1) to gain basic knowledge about childhood cancer, child development, and primary schools. Based on this knowledge and the insights gained during the start up phase, challenges were identified related to school and education which are experienced by children with cancer or dealing with late effects of cancer, their family, teachers, and classmates. The result of this part of the analysis phase were 15 challenges and questions which could not be answered with literature. The results from this part

of the analysis can be found in the orientation of the analysis chapter.

A.2.2 Part 2) Field research

The literature analysis was partly based on information from foreign countries and a larger age range than targeted. Therefore it was questioned if all the challenges identified based on literature were relevant for the target group and context. It was chosen to start with a field research which existed of multiple activities to evaluate the challenges and ask the questions which arose during the literature analysis. Multiple activities with participants with different backgrounds were conducted to gain information from multiple perspectives. Below the reasons and goals of the different activities are explained.

Questionnaire

A small questionnaire was done to gain insight into the perception of people about childhood cancer. It was chosen to ask the questions via a questionnaire to gain enough information in a time efficient way. (Appendix B.2)

Interviews – Childhood cancer

Interviews were done with professionals and experts with experience. It was chosen to conduct interviews with one or two participants (with the same background) at the time to gain in dept information. The first interviews, with EF consultants, were kept open to give the participants the opportunity to tell me about their experiences and give me new, unexpected information. The results of these interviews were used to update the challenges identified from the literature, formulate design directions based on the most relevant challenges with the highest impact, and get a better understanding of childhood cancer. (Appendix B.3.)

The interviews later were more directed to gain the specific information needed. The results of interviews with the mother, psychologists, teachers with experience with cancer and consultant (EAO) were used to gain a better understanding of the chosen design opportunities and to make a chose

between the design opportunities. (Appendix B.5, B.6, B.8, and B.9)

Interviews – School

Two interviews are conducted with teachers at primary schools to gain insight into educating at primary school. The teachers were asked to make a timeline of a regular school day. Based on that timeline questions were asked about being a teacher and educate at primary school. Interview with context mapping activities were used to create a complete understanding and help the participants come up with information they could forget. These insight are used to create guidelines for designing for the school environment. (Appendix B.7 and B.15)

Observations

After interviewing teachers, an observation was done at a primary school. For one day group 5 was observed. The observations helped to form a complete image on primary schools which was not possible with only interviews. Next to this the surrounding was used as inspiration for the design. (Appendix B.13)

Context mapping

Context mapping sessions were done with children aged between 8 and 10 years old to gain insight into children, what they like, what they do not like and empathise with them. This was needed to able to make the design suitable for the age group. I choose to use context mapping tools to make it more fun for the children to participate and used them as guidance for the children to tell their stories. (Appendix B.14)

The results from the different field research activities can be found in the orientation and design opportunity part of the analysis chapter combined with the results from the exploratory literature analysis. After conducting the field research I was able to choose one design opportunity. This design opportunity arose some new questions which were answered in the last part of the analysis.

A.2.3 Part 3) In depth analysis

Within the last part of the analysis an in depth literature analysis was done. Due to the focus of the design opportunity and the ideation, which

was done during this last part of the analysis, some specific question about emotion and mood, physical functioning, and differentiation arose which were answered by a literature study and last field research activities, such as an interview about differentiation (Appendix B. 15.). The results of this part can be found in the part deepening of the chapter analysis.

A.3 Goal defining

A design goal was formulated which was the starting point for the design. By describing the current and desired situation it was possible to define the goal in detail.

A interaction vision was formulated to describe the intended interaction with the product/service. A metaphor for the interaction vision was chosen which served as inspiration for the product/service.

Based on all information gained during the analysis and during the ideation requirements and wishes were formulated. These set the boundaries for the product/service. The list of requirements and wishes was an ongoing document which was updated and redefined with needed.

A.4 Ideation

The ideation consisted of different phases with different activities as explained below.

A.4.1 Ideation

The ideation started with making How to...?'s. The How to...?'s helped to start the ideation and think of solutions for small questions and problems. Based on the results of the How to...?'s a morphological chart was made. The morphological chart was used to organise the ideas from the How to...?'s.

Within the morphological chart eight directions were created which are further explored. This resulted in seven design directions which were evaluated with two teachers and a mother. The goal of this evaluation was to find the strong and weak elements of the design directions and get inspired by the input from the participants. (Appendix B.10.) The results of the evaluation were used to identify the key elements for the product/service.

A.4.2 Conceptualisation

Based on these key elements a brainstorm session was organised with fellow design students (appendix B.12). The brainstorm session was done to think of new possibilities for the product/service. By asking students who were not involved in the project, new and fresh ideas could be generated.

The results of the session were used to create two concept directions, which were combined into one preliminary concept proposal. The preliminary concept proposal was evaluated with a EF consultant to be able to detail the concept proposal according to the needs of the user (appendix B.16.).

A.4.3 Detailing

The strong elements of the preliminary concept were used to create the concept proposal. By making new sketches for the product a concept proposal was created. By doing a desk top research into product

children like, a product style was created, which was used to detail the concept proposal.

Furthermore a small research about recognising the mood states was conducted, to detail the facial expressions on the product. (Appendix B.17.)

A.5 Evaluation

The last phase of the project was evaluating the concept proposal. The evaluation was conducted to be able to evaluate the concept proposal with regard to the set goal, requirements, wishes, and the needs of the users. Based on this evaluation some last changes are made to optimise the concept proposal and recommendations were formulated. (Appendix V)

B Field research

B.1 Presentations

During the exploratory literature research the field research started with visiting a symposium of the VOKK and a meeting about education and cancer for teachers.

B.1.1 Symposium VOKK

November 5th, 2016, the VOKK organised a symposium with the theme Quality of life. The goal of my visit and the insights gained from this visit are explained below.

Goal

The goal to visit the symposium was to get a better understanding of a life with childhood cancer from different perspectives. Next to this, the symposium was visited to get inspiration for a design opportunity.

Symposium

The theme of the symposium was Quality of life. Several experts gave a presentation related to this theme based on their experience.

Professor child oncology

The first speaker was Prof. Dr. R. Pieters. Pieters is a member of the board of the PMC and professor in child oncology at the faculty of medicines in Utrecht (Prinses Maxima Centrum, 2016). During the presentation he presented several researches which are done recent years and what the effects are of these researches. One of the researches presented was about improving the treatment for ALL. Due to the improvements of the treatment the quality of life of the children improved and the survival rate increased.

Psychologist

The second presentation was given by L. Beek, who is a child psychologist within the PMC. During her presentation she focussed on the mission of the PMC and how the quality of life of the child and the family can be measured.

Mother of a survivor

The third speaker was the mother of a child who survived a brain tumor. She explained which treatment her child received and with which late effect her child is dealing with.

The fourth presentation was given by P. Van der

Torre. He is a child physiotherapist in the PMC. He explained the importance of physical exercise for children with cancer and his/her family. He showed how he stimulates children to move within the PMC and he gave tips to parents who they could stimulate themselves and their child to exercise.

Survivor

The last speaker was S. Elfrink (figure 1), she had cancer when she was a teenager. Currently she is in her twenties and is doing research about cancer. Within her presentation she explained briefly how she experienced the treatment of cancer and elaborated on the effects of the cancer and its treatment on her quality of life.



Figure 1: Presentation of a survivor at the VOKK symposium

Main insights

For me the most interesting speaker at the symposium was the survivor S. Elfrink. She gave me a few insights into how she experienced to deal with cancer's late effects. These insights are:

- After the treatment a child is not immediately feeling healthy again. The cancer and its treatment result in physical as well as mental issues which need time to recover and a child needs to learn to deal with these issues.
- One of the most difficult things at school for S. Elfrink was the lack of empathy from her classmates after the treatment. She gave as an example that one of her friends said once to her: "If I did not had to go to gymnastics, I would be able to get good grades for mathematics as well." While she explained that she really wanted to go to gymnastics, but she was not able to do it. She had not enough energy for it and even without gymnastics she had to rest after a day of school.

B.1.2 Meeting: Education & Cancer

November 17th, 2016, the EF of the Radboudumc Amalia kinderziekenhuis organised a meeting about education and cancer for teachers or school personnel who take care of a child with cancer.

Goal

The meeting was visit to gain insight into the challenges teachers experience in class with taking care of children with cancer and which help is able to support them. Furthermore the meeting was used to get in contact with teachers.

Meeting

The meeting existed of two presentations and two interviews.

Presentation physiotherapist

The physiotherapist explained the effects of chemotherapy and radiation in general and with regard to the fine and gross motor skill. Furthermore insight was given into the treatment of different types of leukaemia, and brain and bone tumours.

Presentation EAO consultant

The second presentation was given by Tanja van Roosmalen, who wrote the book 'Wat nu? Een leerling met kanker'. Currently she is working as a EAO consultant. She discussed the topic 'the experience of sick children and siblings'. It was explained which elements influence their experience, the two sided process model, and how teachers can give emotional support.

Interviews

After the presentations the host of the day interviewed a survivor and a teacher. The survivor was a boy of 18 who was diagnosed with ALL when he was 13 years old. The teacher educated a nursery class in which a girl got cancer. During the interviews they explained how they have experienced this period at school.

Main insights

The motor skills and condition of a child are affected by the sickness itself, the treatment, and influences of the child (such as personality, age, intelligence, motor skill levels, and trust in own body), task (such as writing, sport, and school skills), and surroundings (such as protection or challenges, trust, contact with friends and school, isolation, and hospital visits).

Chemotherapy reduces the muscle power, weight gains and change in behaviour, which result in a reduced condition.

The effects of the cancer and its treatment on the fine motor skill are vibrations in the hands, reduced feeling in the hands, and stiffness of the joints. This results in writing and learning to write problems. The severity and the recovery depend on the situation, in most situation a full recovery is possible.

The effects on the grove motor skills are reduced strength, difficulties with walking, difficulties with balance, and difficulties with learning new skills. Just like the effects on the fine motor skills, the severity and recovery depends on the situation, however full recovery is in most situations possible.

The treatment of ALL is 2 to 3 years based on the level of risk. The effects of the motor skills depend on the level of risk and the phase of the treatment.

B.2 Questionnaire

The sickness has an impact on a sibling as well, which is mostly forgotten (also by teachers/school).

The experience of a child of the sickness is depended on what the child knows about the sickness and the treatment, his coping strategies, his parents coping strategies, support, and aged.

Children live in two realities. On the one hand they have to change their life due to the situation on which they have no control. On the other hand they just want to life like they did before the diagnosis.

The two sided process model describes these two realities. It is used for a grieving process, after that, however can be used in this situation as well. Coping with cancer is similar to a grieving process. The two sided process model shows on the one side hope and the focus on recovery and getting better. Children look for distraction, go to school, play with friend, and participate in activities. The other side represents fear and is focussed on loss. Children do not want to go to school, are afraid, have difficulties with social contact, and ask about negative scenarios. School

is perceived by children on the side of hope and becoming better, however school should support children in the focus on fear as well. More information about the two sided process model can be found in appendix B.6.

Emotional support can be given in a safe environment, by not avoiding difficult situations, work with the whole group on emotions, and keep in mind talking is not the only way to coop with emotions.

Children what to be approached in a positive way at school.

Teachers have to coop with their own emotions as well, which can be perceived as difficult.

Adults can make problems of things which are not problems for children.

Children would like to be approached in a clear and transparent way. They are more mature than 'regular' children and would like to be treated like that.

A very small questionnaire was done to gain insight in what people know about childhood cancer and possible misconceptions about cancer.

B.2.1 Method

A questionnaire (figure 2) was done to gain insight into this topic from the field and was combined with the results of the literature and interviews. It was chosen to make use of a questionnaire to be able to get quick results of a large amount of participant.

After conducting a few (5 questionnaires) it appeared that the results were in line the with results of the interviews and literature. Therefore it was decided to not ask more participants to fill out the questionnaire.

Enquête - Kinderkanker

Bedankt voor uw deelname. Het doel van deze enquête is inzicht krijgen in wat mensen weten over het onderwerp kinderkanker. Er zijn geen goede of foute antwoorden die u op de vragen kan geven, daarom wil ik u vragen alle vragen in te vullen. Denk niet te lang na en schrijf alstublieft op wat u denkt, er zijn geen goede of foute antwoorden. Het invullen van de enquête duurt ongeveer 10 minuten.

1. Achtergrond deelnemer

1.1. Geslacht: Man / Vrouw

1.2. Leeftijd: _____

1.3. Nationaliteit: _____

1.4. Hoogst genoten opleiding: _____

1.5. Wat is uw ervaring met kinderkanker? *Bijvoorbeeld: geen, zelf gehad, iemand gekend met kinderkanker, documentaire gezien, boek over gelezen, etc.*

2. Kinderkanker

2.1. Waar denkt u aan bij het woord kinderkanker:

1. _____

2. _____

3. _____

4. _____

5. _____

2.2. Hoeveel kinderen denkt u dat er jaarlijks de diagnose kanker krijgen?

2.3. Wat denkt u dat kinderkanker is?

z.o.z.

2.4. Hoe denkt u dat kinderkanker ontstaat?

2.5. Wat denkt u dat de overeenkomsten en/of verschillen zijn tussen kinderkanker en kanker bij volwassenen?

3. Leukemie

De volgende vragen gaan over leukemie, dit is één van de meest voorkomende vormen van kinderkanker.

3.1. Hoeveel procent van de kinderen met leukemie denkt u dat geneest van leukemie?

3.2. Hoelang denkt u dat de behandeling van leukemie duurt?

3.3. Welke klachten van leukemie en/of bijwerkingen van de behandeling denkt u dat de kinderen met leukemie ervaren?

1. _____

2. _____

3. _____

3.4. Hoeveel procent van de kinderen met leukemie denkt u dat overgaat naar de volgende groep/klas op school? Waarom denkt u dat?

3.5. Hoe denkt u dat de dag van een kind met leukemie eruit ziet/wat kan het kind wel of juist niet?

3.6. Als een kind genezen is verklaard van leukemie denkt u dat het kind daarna nog klachten en/of bijwerkingen heeft? Zo ja welke, wanneer en in welke mate?

Figure 2: Questionnaire about what people know about childhood cancer

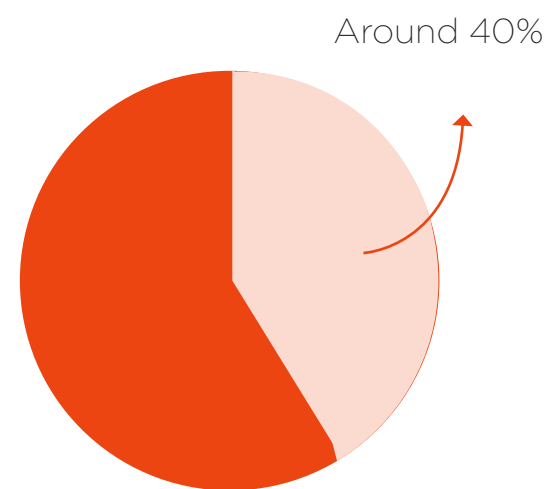
B.2.2 Results

A summary of the results of the questionnaire are presented in figure 3.

The participants expected on average that around **3000** children get cancer each year. Ranging from 80 to 10.000 per year.

The treatment was estimated on around **3 year** ranging from a couple of months to 8 years.

Expected survival rate



Children expected to pass on to the next grade

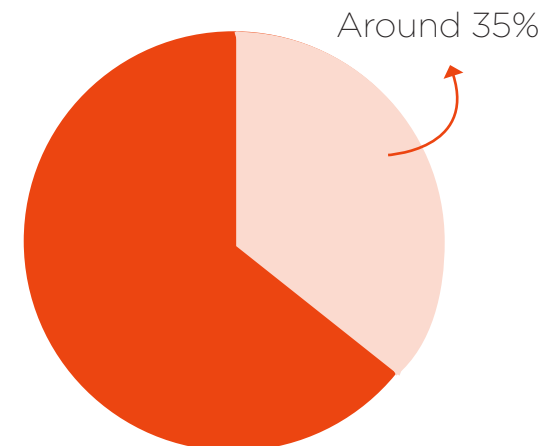


Figure 3: Summary of the results of the questionnaire

B.2.3 Conclusion

Based on the results it can be concluded that the results are in line with the information found during the literature analysis and interviews. The main insights were:

- People estimate the survival rate much lower than the survival rate actually is
- Not much is known about childhood cancer
- Childhood cancer is mainly associated with the movie '8ste groepers huilen niet'
- People underestimate the impact and late effects of cancer

After identifying the challenges based on the exploratory field research, interviews were conducted with EF consultants. These interviews are explained below.

B.3.1 Goal

The main goal of these interview was to validate challenges identified based on literature with the field to formulated design opportunities. To reach this goal two questions for each challenge needed to be answered: 1. How relevant is the challenge? and 2. What is the impact of the challenge? Furthermore the interviews were conducted to gain insight into the work of an EF consultant and the challenges they may experience.

B.3.2 Method

Three interviews of 1 to 1.5 hour were conduct with EF consultants. Interviews made it possible to gain information about predefined topics and start a discussion about interesting answers to gain in depth information.

Participants

The participants were EF consultants from different hospitals. It was chosen to interview EF consultants, since they work with different schools and sick children and their parents and therefore have a range of experiences on which they could base their answers.

The first interview was conducted with two EF consultants from the WKZ. One of the consultants had 13 years experience as EF consultant, and the other had 10.5 year experience. Both were educated at the PABO. The consultants were interviewed together at the EF.

During the second interview a EF consultant from the MC-Sophia participated. She started as Mathematics and Physics teacher and is currently for 10 years working as EF consultant. The interview was conducted at the EF.

The last interview was conducted via the phone with an intern of the LUMC.

Set up

The interviews were divided into three parts: 1) Introduction, 2) EF, and 3) Challenges.

Introduction

During the introduction information was given about myself, the project, and the goal of the interview. Furthermore background information was asked about the participants, such as:
 Wat is uw achtergrond? Wat heeft u gestudeerd en eventuele andere werkervaring.
 Hoe lang doet u dit werk al?
 Hoe zou u omschrijven wat u doet als consulent?

EF

The second part consisted of questions about the role of an EF consultant in guiding a child with cancer. A timeline (figure 4) was made on which the questions were based. (The timeline was not used during the interview via the phone.) The timeline was prepared, so less time would be needed to create it with the participants.

Questions which were asked were:

Van wanneer tot wanneer bent u als consultant betrokken bij het proces? Op welke momenten bent u vooral betrokken en wat doet u dan?

Hoe wordt u betrokken bij het proces? Wie neemt als eerst met u contact op? Wanneer wordt u bij het proces betrokken, continue of alleen bij problemen? Etc.

Is er een verschil in uw taken wanneer u een chronisch ziek kind begeleidt of een kind met kanker?

Zijn er dingen waar u of scholen of kinderen (en hun ouders) tegenaan lopen?

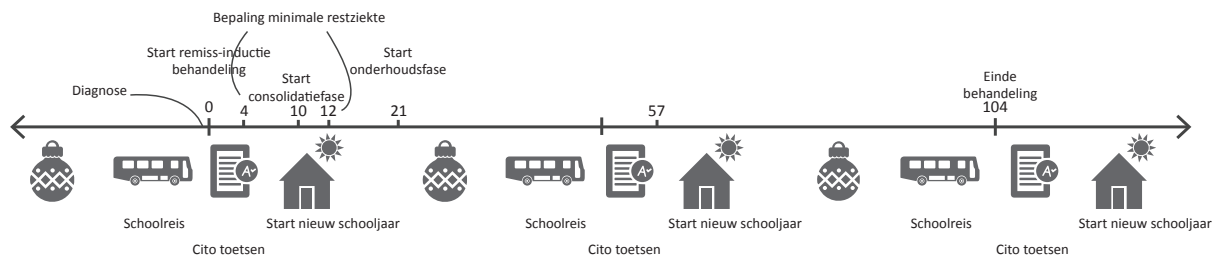


Figure 4: Prepared timeline to gain insight into the role of an EF consultant

Challenges

During the last part of the interview, I presented the identified challenges to the participants and asked them to share their experiences with the challenge and rank them based on relevance and impact in a graph (figure 5). (The graph was not used during the interview via the phone.)

To support the participants probing questions were given such as:

Komt het probleem vaak voor?

Bestaan er al oplossingen voor dit probleem?

Wie ervaart het probleem?

Wat zijn de effecten van het probleem?

Waar is het probleem vooral merkbaar?

After ranking the challenges the participants were asked which challenges they would like to see being solved. About the chosen challenges a short discussion was held.

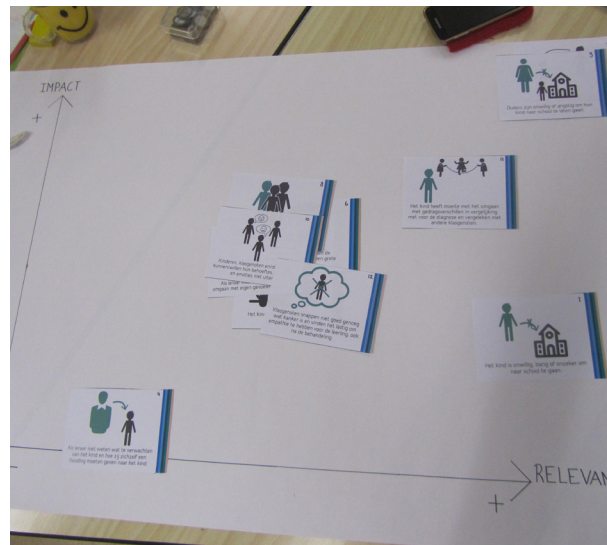


Figure 5: Used graph to rank the challenges which were presented on cards

Analysis

All interview were transcribed based on the recordings made. The first part of the transcript about the EF were used to create statements cards to find the main insights. The information about the challenges was used to rank the challenges in the graph and to formulate a clear vision on the challenges.

B.3.3 Results

Figure 6 till 8 show a summary of each interview.

“Als ze een uurtje bezig zijn met rekeningen dan merken “Hé ondanks dat ik ziek ben, kan ik toch nog rekenen.” Daar hebben ze hun focus even verlegd, wat ook erg fijn is voor de leerlingen.”

“Het komt vaak voor dat de school niet begrijpt hoe groot de impact is op het kind. Dan denken ze bijvoorbeeld dat het kind een maand moet herstellen.”

“Kinderen zijn vaak bang om terug naar school te gaan omdat ze bang zijn achter te lopen”

Figure 7: Summary results of the interview with the EF intern of the LUMC



Figure 6: Summary results of the interview with the EF consultants of the WKZ



B.4 Interview: VOKK

The Vereniging Ouders, Kinderen & Kanker (VOKK) is the patient organisation for families with children with cancer. They support the families and try to establish optimal care throughout the complete process. Next to this, school can contact the VOKK for support as well. Therefore the head of the school department was interviewed. She started to work at the VOKK after her son was treated for ALL.

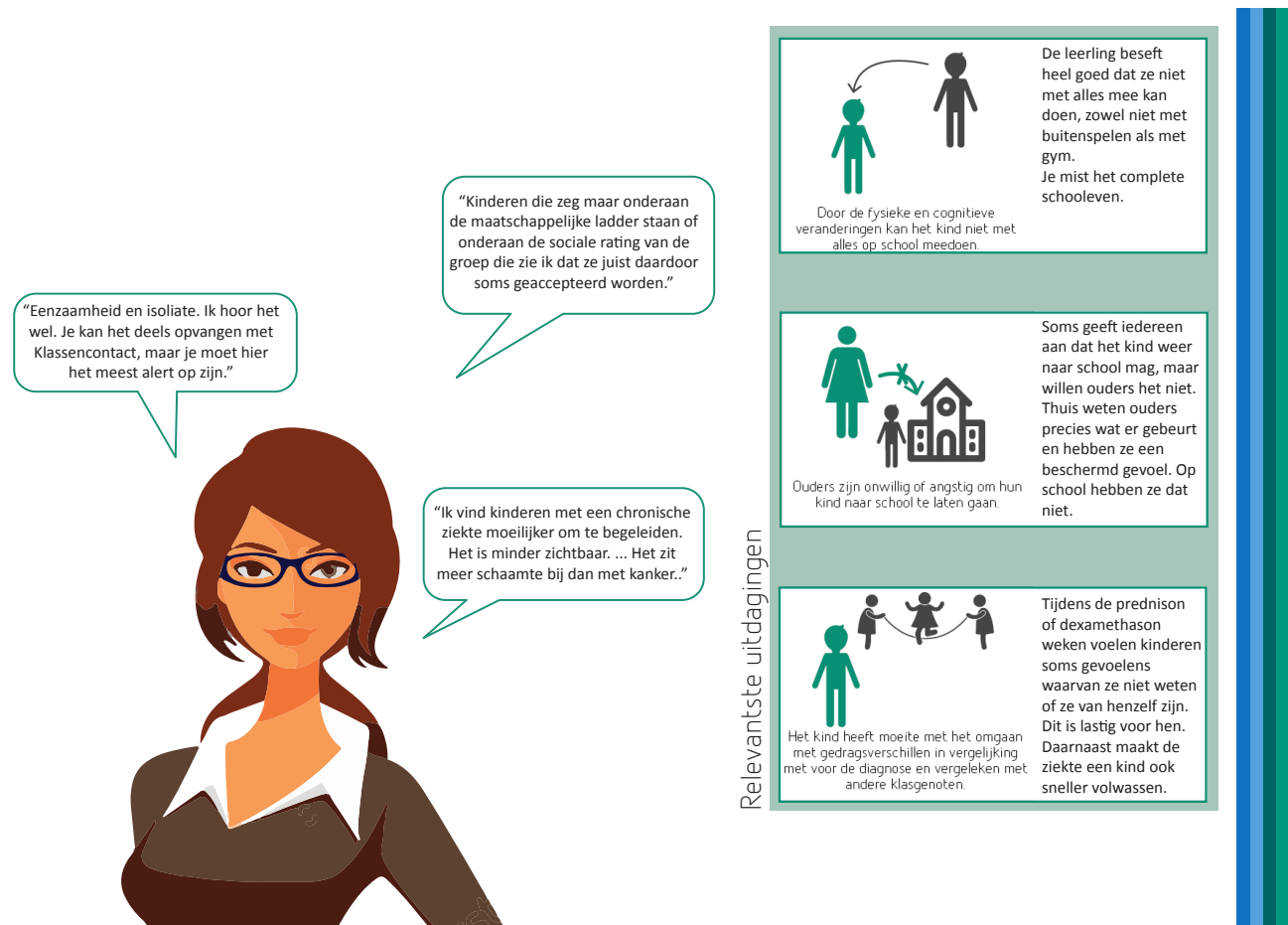


Figure 8: Summary results of the interview with the EF consultant of the MC-Sophia

2.6.4 Conclusion

Based on the results of all three interview the challenges were ranked as presented in chapter 2.6. The explanation of the challenges can be found in appendix L. This ranked is used to make the final ranking of the challenges, as presented in chapter 2.6, in which the results of the literature analysis, presentations, and interviews were combined.

Main insights about the EF are:

- The EF consultants only educate children within the hospital. During this time, schools can contact

the EF for advice and questions. Therefore, the EF consultant is not involved during complete school career of the child. Furthermore, it is tried that each child has their own EF consultant, however this appears not to be possible.

- EF consultants educate children within the hospital, support schools in taking care for sick children, and provide information.
- The process of each child differs a lot. It is not possible to make a general timeline or say which steps must be taken. It is depending on the wishes of the parents and the children. Furthermore schools take care in different ways of the children.

B.4.1 Goal

The goal of the interview was to understand the goals of the VOKK and their work related to school.

B.4.2 Method

An interview was conducted to gain information about the VOKK, the participant explained as well how she has experienced the sickness of her son. The method changed into a discussion about the VOKK, the 'leskoffer', and her experiences.

B.4.3 Results

A summary of the results can be seen in figure 9.

B.4.4 Main insights

- The VOKK support families, including grandparents, and stand up for the rights of the families
- The VOKK supports teacher with the 'leskoffer'. This is a box with materials to educate the classmates about cancer.
- The box is not often led to school, so the VOKK is probably not the best way to reach teachers
- School prefer new and digital materials
- Communication is crucial between everybody and about everything.

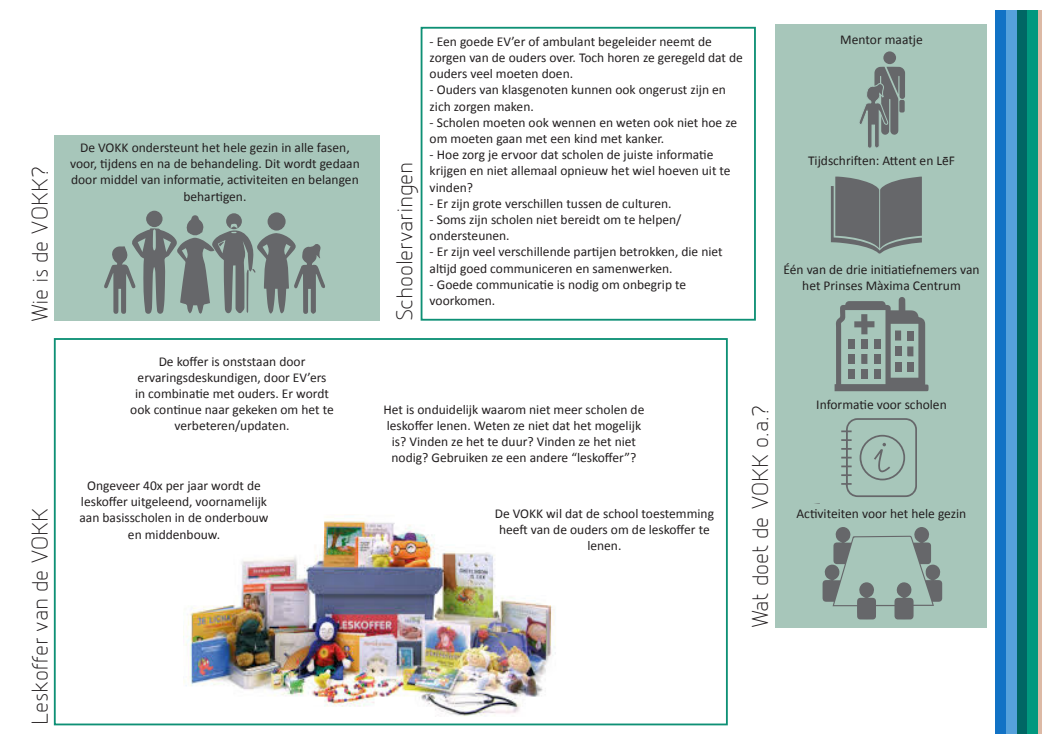


Figure 9: Summary results of the interview with the VOKK

B.5 Interview: Design Opportunities

After formulating the design opportunities, interviews were conducted with different experts with experiences with children with cancer.

B.5.1 Goal

There were two goals to conduct the interviews. The first goal was to gain in depth information about the design opportunities from different perspectives to be able to specify the direction. The second goal was to evaluate the opportunities by answering the questions from different perspective: 1. How relevant is the design opportunity? and 2. What is the impact of the design opportunity? The research question was: What are the participants experiences with each design opportunity and which opportunity should I choose?

B.5.2 Method

To evaluate the design opportunities 1 hour interviews were conducted. During the formulation of the design opportunities questions arose, which were most suitable to be answered with interviews.

Participants

There are three interviews done. The first interview was conducted with a mother of a child who had a brain tumour when she was 2 years old. Currently she is 14 years old and dealing with the late effects. The second interview was done with the teacher and IC of this child at primary school. The last interview was conducted with two child psychologist with experience in supporting children who have or had cancer or a family member.

Set up

The set up for all three interviews was similar, however the asked questions were adjusted to the different background of the participants.

Introduction

During the introduction information was given about myself, the project, and the goal of the interview. Furthermore background information was asked

about the participants, such as:

- Wat is uw achtergrond?
- Wat is uw ervaring het het begeleiden van kinder met kanker?

School

Questions were asked about the topic school and cancer, such as:

- Waarom vond u het belangrijk dat u dochter terug naar school ging?
- Welke maatregelen heeft school genomen om uw dochter te ondersteunen?
- Wat is de invloed van school op the sociale en emotionele ontwikkeling van kinderen?

Direction 1: Understanding what to expect

After explaining the direction the participants were asked to describe a situation related to this opportunity after which a discussion about the direction was started. Furthermore questions were asked, such as:

- Welke manieren gebruiken kinderen om hun gevoelens en emoties te communiceren?
- Had uw dochter behoefte aan het uiten van haar emoties binnen de klas?

Direction 2: Empathy of classmates

The set up of the second direction similar to the first direction. Examples of questions asked about this direction were:

- Hoe gingen klasgenoten om met de late effecten die uw dochter ervaaarde?
- Hoe kan empathie gecreëerd worden bij kinderen?

Direction 3: Fear to go to school

This direction had as well the same set up. Examples of questions asked were:

- Wat voor angst voelen de kinderen of ouders?
- Hoe voelde u zich toen uw dochter naar school ging?

After discussing all three directions the participants were asked to indicate which design opportunity they thought I should choose to continue with.

Analysis

Based on the made transcripts statement cards were made for each design direction. Based on these statement cards clusters were made to rank the opportunities based on relevance and impact.

B.5.3 Results

A summary of the results from the interviews are presented in figure 10 and 12.

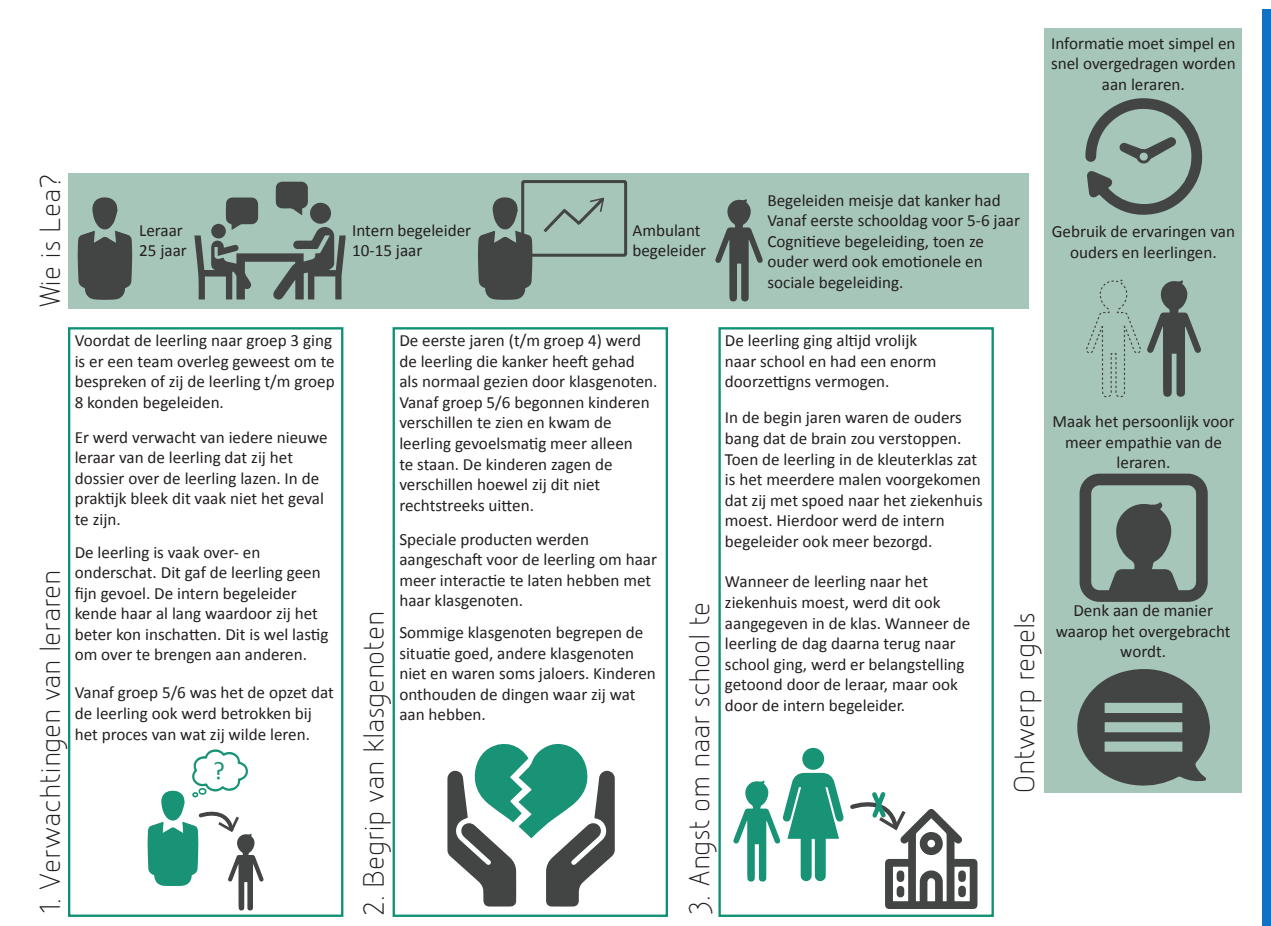


Figure 10: Summary results of the interview with the mother of a survivor

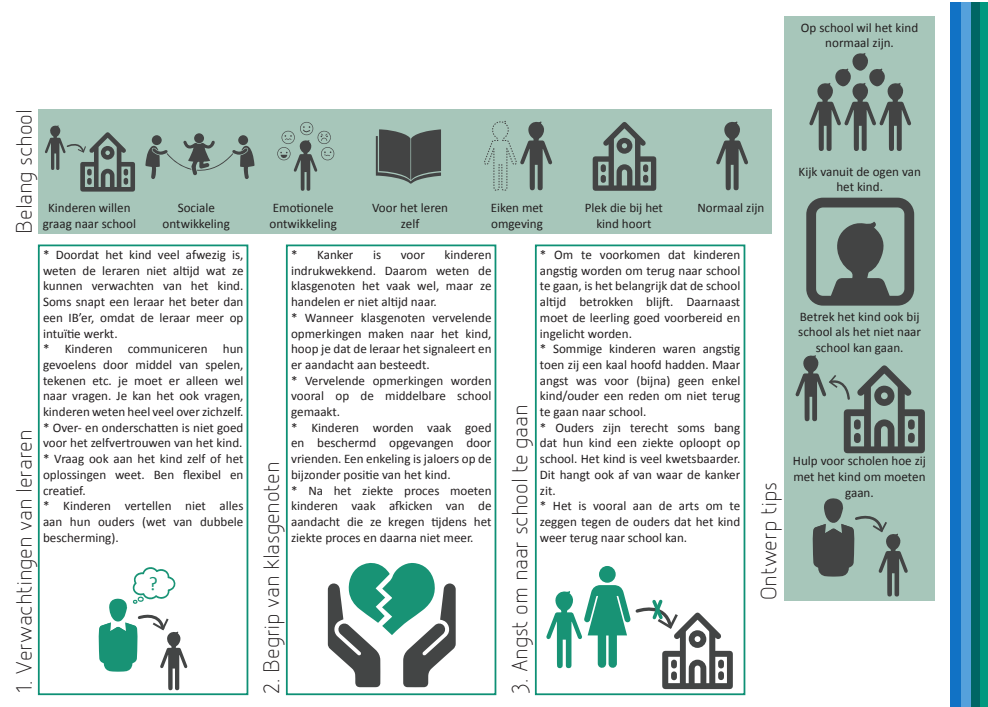


Figure 11: Summary results of the interview with two child psychologists

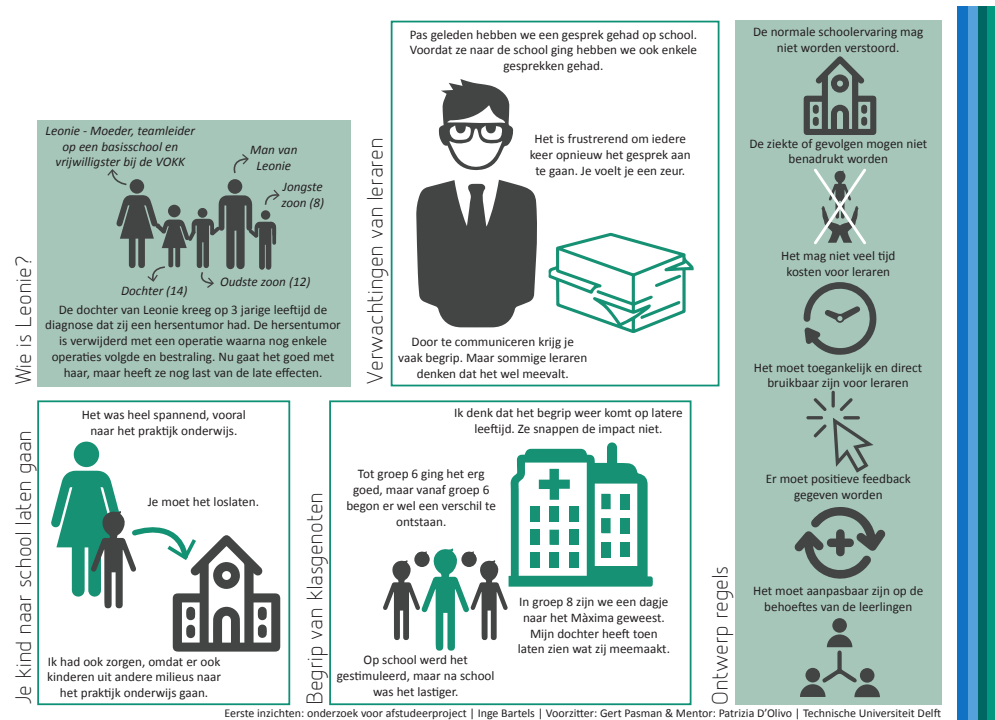


Figure 12: Summary results of the interview with the teacher/IC of a survivor

B.5.4 Main insights

Based on the results the design opportunities were ranked as presented in chapter 2.7. This ranking was combined with the results of the interviews with the EF consultants, presentations, and literature analysis to rank the opportunities as presented in chapter 2.7.

Main insights:

- Children are often very enthusiastic to go to school. Parents are sometimes afraid, mainly since they fear their child will get sick.
- Lack of empathy by classmates is mainly experienced at high school or after school.
- Children are often under- or overestimated by teachers and IC's. Teachers often understand the situation better than IC's, since they work more with the children and use their intuition.
- Children at a younger age are not able to understand the impact of cancer.
- Parents often have to explain things multiple times, which result in frustrations.
- Children express their emotions as well in playing or drawing, however explanations must be asked to prevent wrong interpretations.
- Under- or overestimation has a negative influence of the self-confidence of the child.
- Children do not tell everything to their parents to protect themselves, this is the law of double protection.

B.6 Interview: Tanja van Roosmalen

After the presentation of Tanja van Roosmalen at the meeting about education and cancer, I contacted van Roosmalen to ask her more about the two sided process model she presented. Van Roosmalen has worked for about 8 years as EAO with a remedial educationalist background after which she specialised herself as mourning therapist.

B.6.1 Goal

Van Roosmalen was interviewed to retrieve information about the work of an EAO, the two sided process model, and how school can use this in supporting children with cancer.

B.6.2 Method

Van Roosmalen was interviewed for half an hour about her background and the two sided process model. Examples of questions asked are:

- What is your role as EAO consultant within the education for a child with cancer?
- What is the 'zorgboom'?
- Why is it important to give children the possibility to focus on the loss focused side of the model?

B.6.3 Results

As summary of the results is shown in figure 13.

'veel scholen gebruiken de zorgboom om over emoties en zorgen te praten. Grote zorgen zitten dan op de dikke takken, en kleinere zorgen op de dunnere takken. Deze hangen ze dan op aan een boom in de klas, en ze praten dan over de emoties.'

'Kind wilt vaak op school niet over ziekte praten, maar als je er helemaal geen aandacht aan besteed laat je het kind ook weer heel alleen, want die gevoelens zitten er natuurlijk wel'

'Als de diagnose valt moet je ook goed investeren in de vertrouwensrelatie, door vaak op bezoek te gaan maar ook dingen over jezelf te vertellen. Als kinderen uit de ziekenhuis wereld komen, en ze moeten weer naar de schoolwereld is het heel fijn als je als leerkracht ook weet in wat voor situatie de leerling zit, dan is het voor de leerling ook veel makkelijker om de brug te slaan en de leerkracht daarin mee te nemen. Als de leerkracht daarbij is geweest, hoeft de leerling minder uit te leggen, voelt veel vertrouwder'

'Leerlingen willen op school vaak eventjes niet de zieke leerling zijn, daardoor laten ze de emotionele kant op school vaak ook niet zien, het is vaak een pot van verdriet waar de deksel op gaat als ze naar school gaan'

'Broertjes en zusjes van het zieke kind uiten het soms juist wel op school, omdat ze zich thuis juist sterk proberen te houden, als leerkracht hoef je dan eigenlijk alleen een luisterend oor te bieden'

'scholen moeten altijd goed aftasten met wie de leerling een vertrouwensrelatie heeft, dit is niet altijd de klassenleerkracht, maar soms ook leerkracht van vorig jaar of RT'er'

B.6.4 Main insights

The main insights were:

- An EAO consultant can be contacted by school for support for special needs children or by the parents/children themselves. The EAO advises schools and arrange solution in taking care of a child with special needs. The EAO stays involved in the child's school career as long as the child wants. The tasks of an EAO consultant is similar as the EF consultant, however is not connected to a hospital.
- School is the place where children feel hope, the recovery focussed side of the model in which they would like to be challenged in the thing they are able to do. Nevertheless schools should support children when needed in the loss focused side. Therefore a relation of trust should be create with the child to have a safe environment for the child to express himself.
- Children want to be normal at school, this is the place where they do not have to feel sick or where they are treated as patients. Therefore not all children will be willing to talk about how they are feeling. The child should have the option to talk about it.
- Some children do not want to express themselves at home, in such situations it could be very helpful if the school provides a moment for the child he can express himself.

Figure 13: Summary results of the interview with Tanja van Roosmalen

B.7 Interview: Teacher School Day

To gain a complete understanding of primary school and teachers, the literature analysis and observations were combined with an interview. The interview is explained in this appendix.

B.7.1 Goal

The goal was to gain insight into the how primary school work, the school experience of children and teachers, and the responsibilities of the teacher. These insights are used to formulate requirements and wishes and find design opportunities within the school context.

B.7.2 Method

A 1.5 hour interview was conducted with a primary school teacher of group 5. This was her first year as a teacher with her own class, however had a lot of experience at a variety of schools where she worked as temporary worker.

Set up

The interview was inspired by context mapping tools to gain insight into deeper level of knowledge, so the explicit and latent knowledge.

Creating a timeline

After the introduction the participant was asked to create a timeline of a regular school day from the moment she starts to prepare the day till she completely finished her work. She was asked to take a day in her made and visualise that day using the provided stickers and by drawing or writing (figure 14). After she finished the timeline she was asked to explain it.

Adding experiences

After the explanation the participant was asked to add the following elements and explain her choices.

- Emotion cards (figure 14) to express her emotions during the day
- Emotion cards to express the emotions of the children
- Red stickers to indicate the busy moments of the day for herself or the children
- Green stickers to indicate the relaxed (or least busy) moments of the day for herself or the children



Figure 14: The materials to make the timeline and add experiences to it

Questions

At last questions were about topics not answered within the timeline, such as:

- Which rules do you apply?
- In which way is the social & personality development of the children supported?
- How are the goals of the lessons set and are these communicated?
- How do you take care of children with special needs?/
- Which education methods do you use?
- How does the student tracking system works?
- What should be taken into account for designing product for the school context?

Analyse

A transcript is made and used to summarise the results.

B.7.3 Results

Figure 15 shows the results of the timeline with a summary of the results.



Figure 15: Summary results of the interview with a teacher about a regular school day

B.7.4 Conclusion

Based on the interview a set up for the structure of a day and lesson was created as presented in chapter 2.3.

Furthermore the following insights were gained:

- Teacher create their own structure of the day and lesson, however most teachers use the same structure.
- Teachers empathise with their students, the children's behaviour and emotions influence the mood of the teacher.
- A school day is busy for children and teachers. During the start up and closure of the day and a lesson teacher and children are especially busy, which makes these moments least suitable for an intervention. When the children work individually or in groups on their assignments there is time for an intervention.
- The social & personality development is supported by dedicated lessons and throughout the day, for example after an incident between two children.
- The goal of a lesson is in general set by the used education method and mostly communicated to the children via the book or during the instructions.
- Teacher have many more responsibilities and thus tasks, than just teaching the children. Tasks of a teacher are: coach individual children, prepare lessons, organise school activities, assemble with colleagues and the management, monitor development, write education plans, and maintain contact with parents and other school personnel.
- Lessons in group 5 are given about: reading, writing, grammar, history, biology, geography, crafts, mathematics, and physical education.

B.8 Interview: Teacher Experience (1)

An interview was conducted with a teacher of the sibling (nursery class) of a girl with skin cancer. This teacher was actively involved in taking care of the sick child and the sibling. The teacher knew the girl would pass away, therefore she thought the chosen design opportunity was relevant for the girl. The sibling was in nursery class, due to which the chosen direction was also not that relevant, since it is still very playful.

B.8.1 Goal

The initial goal was to gain more information about the chosen design opportunity, however as explained above the challenge addressed in the opportunity was not that much experienced, so the goal changed during the interview to gain more information about the experience of a teacher in taking care for a sick child.

B.8.2 Method

A 1 hour interview was conducted which started with a small introduction of the project. Afterwards questions were asked about her background and her experience with taking care of a sick child or sibling. The second part consisted of creating a timeline. A timeline was prepared (similar to the timeline used for the interview with the EF consultants appendix B.3) to be able to find the deeper information in a shorter time. Based on the timeline questions were asked about how the process went and how she and the children experienced it.

B.8.3 Results

An summary of the results can be seen in figure 16.

“Er stond een doos in de klas, waar ten alle tijden een vraag in gestopt mocht worden. Er hing ook een boom waar klasgenoten gedachten of zorgen op konden hangen. Zo leerden ze zware gedachten verwoorden. Je kan het niet wegnemen maar je kan er wel mee leren omgaan.”

“Zusje van 6 jaar is elke dag met al haar verdriet en verhalen op school geweest, dit heeft klasgenoten veel geleerd, over hoe je emoties uit e.d. Zusje moest emoties kwijt, kon het heel goed verwoorden.”

“ We hebben de vakken goed op haar opgestemd. op momenten dat ze wel een uurtje op school kwam deden we wat makkelijke vakken, en geen vakken waar ze meer moeite mee had.”

B.8.4 Main insights

Due to the not recognised design opportunity and different situation of a child who is not becoming better, less insights were gained than hoped.

- Children want to be normal and just go to school, they also still want to belong to the group.
- By talking about emotions it also learned the classmates about emotions
- As a teacher she missed guidance, so she use her gut feeling to do the best she could.
- Even though as a parent of teacher you do not want the children to see the pain, however it is needed to discuss the situation with the class.
- There were meetings arranged for the parents of the classmates of the sick child and sibling.
- The sibling asked questions about her sister, however the teacher could not answer it. At home she did not asked these questions. At school is a different situation and different questions are asked by children.
- It is possible to rearrange the daily schedule for the sick child.

Figure 16: Summary results of the interview with a teacher how educated the sibling of a child with cancer

B.9 Interview: Teacher Experience (2)

A second interview with a teacher with experience in taking care of a child with cancer was conducted. During the interview it appeared the sick child was in nursery class and did not survive the sickness, due to which not all questions were relevant.

B.9.1 Goal

The goal of the interview was to gain insight into how teachers experience taking care for a child with cancer and how she experience estimating what a child is able to do. Unfortunately the last part could not be answered, since this was not relevant for the participant.

‘met ouders afgesproken dat ze op school zoveel mogelijk geluksmomentjes moet ervaren, moeilijkere werkjes hebben we daarom laten liggen, alles kon ze goed!, geen evaluaties en oudergesprekken meer gedaan over prestaties, dat had geen prio’

“Het was heel heftig om haar in de klas te hebben, het was voor mij de eerste keer en ik had een grote angst dat het geen goede afloop zal hebben”

“Klasgenoten zeiden ‘dokters maken toch altijd iedereen beter’, een moeilijk proces voor kinderen als ze dan niet beter gaat worden’

‘ik had het met haar niet over haar gevoelens als ze op school was, ze heeft het al moeilijk genoeg, laat haar op school maar gewoon genieten’

“We gingen vaak bij haar op bezoek, spulletjes van school mee, zodat ze betrokken bleef bij de klas en wat we deden”

Figure 17: Summary results of the interview with a teacher how educated a child with cancer

B.9.2 Method

A half an hour interview was conducted by phone. During this interview questions were asked like:

- What is the perception of children about cancer?
- How does a school look like?
- What changes are made for a child with cancer at school?/What steps are taken to be able to take care for the child?
- How do teachers experience teaching a child with cancer?
- How do classmates experience a child with cancer?
- How do teachers decide what can or cannot be expected from a child with cancer?
- How do children with cancer express themselves?
- What is the impact of the expectation of a teacher on a child?

B.9.3 Results

Figure 17 gives an small overview of the results of the interview.

B.9.4 Main insights

Due to the not recognised design opportunity and different situation of a child who is not becoming better, less insights were gained than hoped.

- The process was very intense and difficult for the teacher.
- The classmates were young, though they had empathy for the child. However it was also possible that they were doing other things directly afterwards.
- The sick child came to school to have a moment of happiness.
- At school the child wanted to be normal.
- School was low priority since they knew she was not going to survive the cancer. Due to this there was no pressure from school.
- At school they did not talk about emotions, so she was not reminded of her sickness.

B.10 Evaluation: Design Directions

Based on the morphological chart 7 design directions were created as presented in chapter 4.2 and appendix R. This appendix elaborates on the evaluation of these directions.

B.10.1 Goal

The goal of the evaluation was to find the strong and weak points of the design directions from different perspectives. The insights in the strong and weak elements are used to create key elements and new requirements and wishes for the concept proposal.

B.10.2 Method

The design directions were very abstract, therefore example ideas were made with the as core the design direction. The design directions are explained in figure 18 (next pages) combined with the results. Since I was interested in the opinion of the participants about the core of these ideas, I decided to evaluate the ideas with interviews of around 1 hour.

Participants

Three interviews were conducted with participants with different experiences in order to gain insights from different perspectives.

The first interview was conducted with a teacher/IC. She also participated in the interview about the design opportunities. The interview was conducted via the phone. The visuals were e-mailed before.

The second interview was conducted with the mother of a survivor. She participated as well in the interview about the design opportunities.

The last participant was a teacher who educated last year the sibling of a child with skin cancer and she was involved in the communication between the parent and the teacher of the sick child. Before evaluating the design ideas, this teacher was interviewed about her experience as presented in appendix B.9.

Set up

The interview was started with explaining the design goal and create together a familiar scenario in which the design directions could have fit. When this was clear, the 7 directions were discussed one by one using this structure:

Explanation: The envisioned use and functions of the design direction were shown and explained (Appendix R).

Open questions: After the explanation several open questions about their first impression were asked, such as:

- Wat vind je van het idee?
- Zou je het zelf gebruiken in het besproken scenario?

Strong and weak elements: Expected strong and weak elements are explained and the opinion of the participants about them was asked. This helped in evaluation the design direction on the important elements.

Final questions: At last design direction specific questions were asked, such as:

- Wat vind je er van om de intern begeleider in het ontwerp te betrekken?
- Wat vind je van het gebruik van een telefoon binnen het ontwerp?

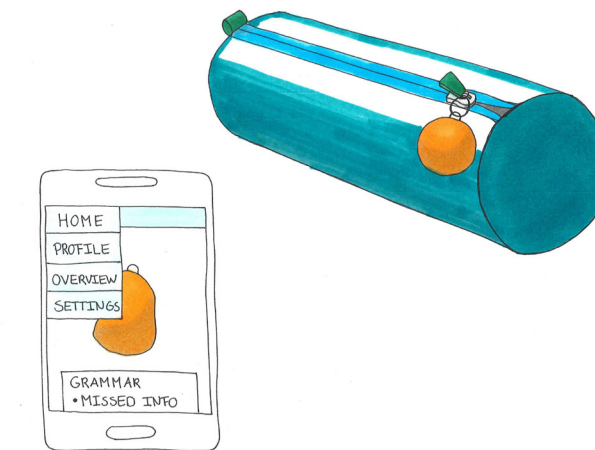
After discussing all design directions the participants were asked to choose the three directions which they thought were most promising or most liked by them.

Analysis

Transcripts are made of the evaluations to be able to cluster the strong and weak elements of the design directions. These strong and weak elements are clustered into key elements for the product/service and used to create new requirements and wishes.

B.10.3 Results

A summary of the results of the evaluation for each of the design directions can be seen in figure 18.



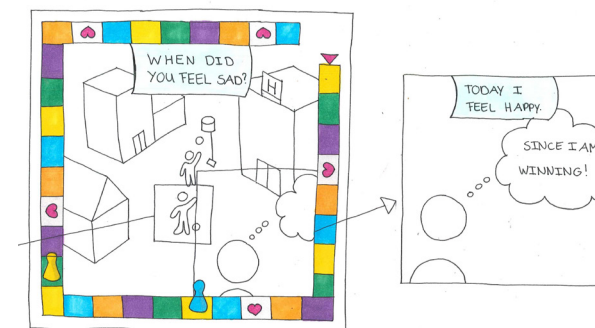
Design direction 1

Strong points

- Personal product for the child attached to a product of the child. "This gives the child not the feeling he has something extra again." - Teacher/IC
- "It would be useful for all children who do not dare to express themselves." - Teacher

Weak points

- Too much information for the parents. "Too much information could lead to confusion." - Teacher/IC
- Difficult for the teacher. "It is hard to see and you have to respond immediately if it is red." - Mother



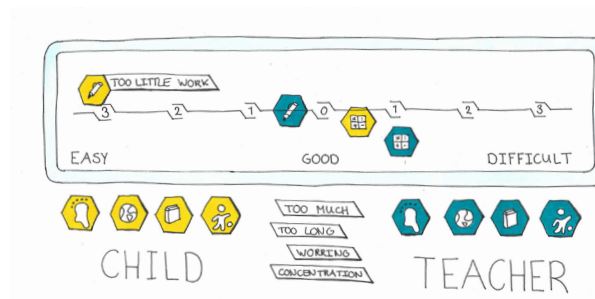
Design direction 2

Strong points

- Role of the classmates. "The cancer is not point out, yet the children know each others feelings." Teacher/IC
- Suitable for the school context. "This is a hot item, especially since their are more children with special needs." - Mother

Weak points

- The child needs to feel secure, before he will express himself.
- "What is the next step? Only talking about emotions is not enough." - Mother



Design direction 3

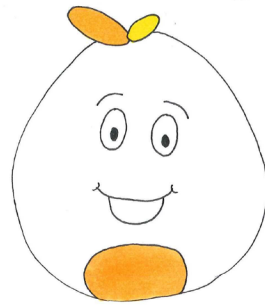
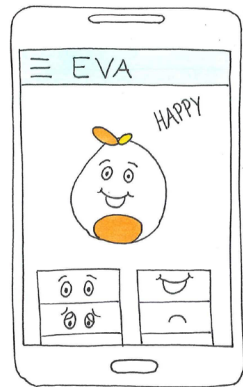
Strong points

- "It starts anonymous." - Mother. This could help the children to become more easily honest.
- Combined with reasons, too prevent teacher from making wrong conclusions.

Weak points

- Time consuming. "We already try to evaluate, but is not always possible due to the time." - Teacher
- By reflecting at the end of the activity, the problems which could occur during the activity are not solved.

Figure 18: Summary results of the evaluation of the design directions categorised for each direction



Design direction 4

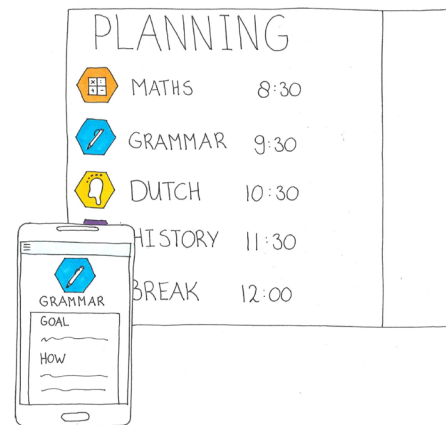
Strong points
 - "A very simple and quick way to express yourself. This is great." - Mother
 - "It think it would make the child really happy. It is very appealing for children." - Teacher/IC

Weak points
 - "Indirect is not enough, personal communication is still needed." - Teacher/IC
 - "Not comfortable for the child if all children can see the buddy and thus his emotions."
 - Phones at at most primary school forbidden.

Design direction 5

Strong points
 - "An individual planning is always good. But that can be done on paper as well." - Teacher
 - "Self-control is really part of this idea" - Mother

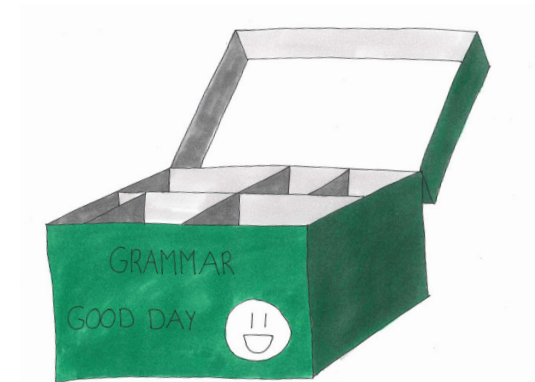
Weak points
 - Time consuming
 - Teacher should do it together with the child to prevent the child from overestimating himself.
 - "It should be combined with evaluation, maybe only if they finished the planning. Since the children will probably overestimate themselves." - Teacher/IC



Design direction 6

Strong points
 - Combine with feelings. "Children with cancer will feel often happy if they are able to go to school." - Mother

Weak points
 - Too abstract.
 - Difficult for children too express their energy level. "Difficult for children, energy is very abstract." - Mother, - "Children need to have a good self-image to be able to do this." - Teacher



Design direction 7

Strong points
 - "Ready to use. I like that." - Mother
 - "I recognise the idea of the colours. That is very strong." - Teacher/IC

Weak points
 - "I would name it differently. Bad day sound as if it cannot become better." - Teacher
 - "I do not like the IC prepares the boxes. The teacher knows the child much better and the assignments which are done in class." - Teacher/IC

B.10.4 Conclusion

Based on the results of the evaluation several key elements for the concept proposal are identified. These key elements are used as starting point for the further ideation for concept directions.

Mood & Energy level

Most of the children will feel happy when they are able to go to school. Therefore it is important to combine the mood of the child with the child's energy level. The combination of these two elements will give the teacher an understanding of what the child is be able to do.

Planning & Evaluation

A planning was preferred, since it is something known for teachers and direct usable for teachers. The planning should be combined with a brief evaluation to be able to not under- or overestimate the child. Within the ideation about this element the time limitation of teachers should be taken into account.

Self-control

Self-control for the child is very important. Children in group 5/6 start to become more independent and to create self-control. However the children with cancer do not have this possibility to the limitations they experience due to the cancer. For example parents who bring their child to school instead of going themselves. By adding self-control in the design the children do develop the self-control only in a different way than regular children would do.

Role parents

Parents could be included in the design, however only in a general way. Too specific information could give a wrong impression to the parents which results in unneeded worries or stress. It is not needed to include them, since teachers will always communicate with the parents when this is needed.

Role classmates

The classmates must be part of the design. The child is part of the class and wants to get a feeling of belonging. The design or parts of the design should be together or be similar to the classmates.

Requirements

Next to these key elements, there are new requirements and wishes formulated for the concept proposal based on the results. The three most important requirements formulated based on the results of the evaluation are:

- The product should be able to measure or show both mood and energy level of the child.

As explained in figure 18, mood is not enough for the teacher to understand what to expect from the child. Mood must be combined with the energy level of the child.

- The product should give the child a secure feeling.

The child will express his mood in/with the product. To support the child in doing this and honestly, the product should give the child a secure feeling.

- The child must be able to express his emotions and energy level in a concrete way.

Energy level is abstract and children will not be able to express in an abstract way.

B.11 Presentations Research & Design

One of the courses at high schools in the Netherlands for children at the 'technasium' is research & design (R&D). Within this course children learn how to do research and design products and services by executing projects for different clients. The VOKK was one of clients for a project. The project was started by a presentation about childhood cancer in which they received the assignment. The children had to design a product/service to minimise reduce scolding with the word cancer at high schools. After 8 weeks they had to present their designs. These presentations were visited by me.

B.11.1 Goal

The goal of visiting the presentations was to gain inspiration for the design from the perspective of children and create an understanding of what children would like within a design.

B.11.2 Method

8 Groups of children presented their work by explaining their research and design.



1. Movie with humour and fantasy about cancer
2. Poster, keep it short and clear
3. Kahoot quiz with stuffed toy, make it interactive
4. Application of game fun to do
5. Game interactive
6. Cartoon, much more fun to read than a normal book
7. Movie, is better than text
8. New paper school

B.11.3 Results

Figure 19 gives an overview of the presentations given

B.11.4 Main insights

The main insights of the presentations were:

- Children prefer visual information over textual information
- Children prefer to gain information interactive and fast
- Children like to humor
- Children like new media, such as apps and digital games



Figure 19: Presentations given by the children

B.12 Brainstorm Session

A brainstorm session was done with fellow student with the key elements for the product/service as starting point.

B.12.1 Goal

A brainstorm session was arranged to gain new ideas and gain inspiration for how to combine the key elements to create the concept directions.

B.12.2 Method

A brainstorm session with 4 fellow design students was conducted. The session was divided into 3 parts, which will be explained below.

Part 1

The first part of the session existed of an introduction into the topic and each other. A brief presentation was given in which I explained the set up of the morning and the design goal of my project. After the presentation the students were given a large sheet with the word childhood cancer and a sheet with the words primary school. I asked to students to write down everything what popped into their minds related to these words (figure 20). This was an warming up exercise to make the students familiar with the topic of my project.



Figure 20: Brainstorming about school and cancer

Part 2

Based on the results of the warming up exercise I explained the students some relevant things about cancer and primary school as preparation for the brainwriting session (figure 21). How to ...?'s were prepared based on the sub-problems. The students worked separately 3 minutes on each How to...?. The results were discussed after all students worked at all the How to...?'s.

Examples of the How to...?'s:

- Hoe kun je gevoelens/emoties met elkaar delen?
- Hoe kun je een realistische verwachting creëren?
- Hoe kun je ouders betrekken bij het met hun kind gaat op school?



Figure 21: How to..?

Part 3

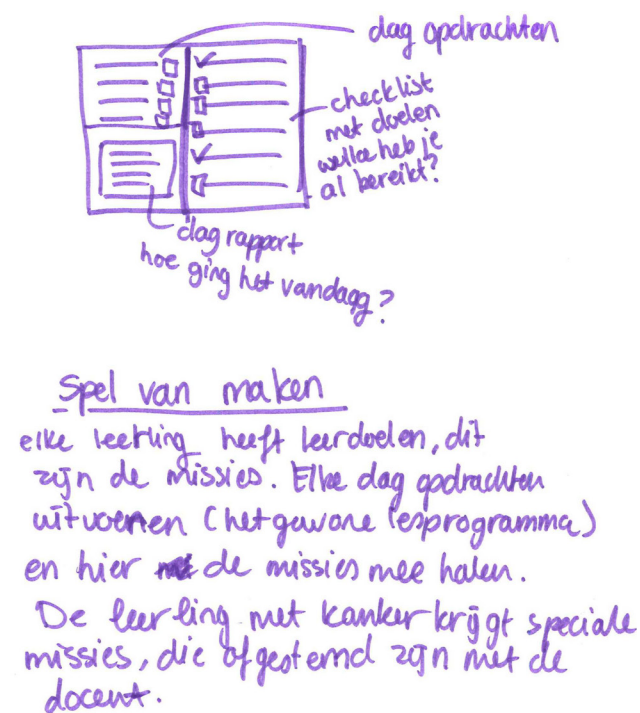
I started the last part of the session with an explanation of the key elements I identified. Afterwards the students were asked to come up with one or multiple idea(s) for one of these elements or a combination for these elements. The students were allowed to discuss, however they choose to work individually. Therefore the session was ended with all students presenting their ideas (figure 22).



Figure 22: Combining the key elements

B.12.3 Results

Figure 23 gives an impression of the results from the brainstorm session.



B.12.4 Conclusion

Based on the brainstormed it can be concluded that combining all key elements is difficult and requires a rather complex design existing of multiple elements.

Three ideas were used as inspiration for creating the concept directions.

The first idea was a game played by the group by performing tasks/challenges by themselves. The idea of a group activity was further explored.

The second idea was emotions card, which could be filled out with the parents, so the child could indicate how he is feeling. The idea of emotion cards was already considered, since it keeps coming back makes it interesting.

The last idea was a mood board. Before the brainstorm I only thought about emotion and not mood. This idea made me explore the difference between mood and emotions.

Figure 23: Idea of the brainstorm session which served as inspiration

As presented in chapter 2.4 observations are done. The goal and results of this observation are shown in this appendix.

B.13.1 Goal

The goal of the observations was to gain knowledge about how classrooms look like, what kind of product/service are used, and how primary schools work. These information was used to create a full understanding of the context of use of the product/service.

B.13.3 Results & Conclusion

Figure 24 (next page) shows the results and conclusion with regard to how primary schools look like. Figure 25 (page 37) shows products/tools which are used in class.

B.13.2 Method

It was chosen to observe to gain insights into the tacit knowledge. Explicit and latent knowledge was gained during the interview, so an observations would complete the complete understanding.

For one complete day a teacher and class (group 5) were observed at the Toonladder in Nieuwegein.



Table layout

The tables of the children are placed in groups which contributes to the collaboration between the children. The children have an own table. However for some courses the children switch places, so the children who need more help are sitting in the front of the classroom. At the back of the classroom (or in the hallway) there is a table for a child who wants to or has to work alone.

Desk teacher

The desk of the teacher is placed on the front of the classroom, so the teacher has an overview on the classroom. At the side of the desk there is space for the teacher to help one or two children.

Cabinets

The cabinets are placed in the back of the classroom and accessible for the children. The children can help handing out and storing the materials. Next to this, the children can easily take materials of other courses if they have finished their work.

Decoration

The classroom is decorated with many educational materials, products made by the children, and decoration within a theme. The theme for this period was America.

Figure 24: Appearance classroom and main insights gained from it



Work mode

When the children work on the assignments a clock is set to indicate the time the children have left to work on the assignments. Next to this it is indicated if the children have to work individually or if they are allowed to consult each other or work together. The children also have a cube which they can use to indicate if they have a question (question mark), if they do not want to be disturbed by classmates (red), or they are willing to work together with other classmates (green).

Furthermore the schedule of the day is presented on the board.

Make learning visible

A lot of materials in the classroom are related to make learning visible. The pencils indicate which multiplication tables the children already know, the stars indicate their level for each goal, and on the poster the children can indicate which week assignments they have finished.

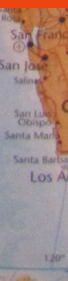
Simulate social & personality development

Several materials within the classroom stimulate the social & personality development. At this school the children had to formulate a personal goal on which they want to work and the children made a 'help desk' in which the children indicated their strengths.

Own products

Children have a few own products. Some of these products are possession of the school and borrowed to the children, other products are brought by the children. The tablets are for example provided by the school. After the school day the teacher makes sure the tablets will be charged. Products which bring the children themselves are for example their pencil case and folder.

Figure 25: Products used within the classroom and main insights gained from it



B.14 Context Mapping Sessions

Chapter 2.2 presented the child development of which the interests, preferences, and world of children aged 8-10 years old was part. This was based on a context mapping sessions which are explained below.

B.14.1 Goal

The goal was to create an understanding of children's interests and preferences. This is used to make the product/service appealing to children and suit their vision on maternity.

B.14.2 Method

Context mapping sessions were conducted to gain in depth information and make the session fun for the children to participate. The session were conducted in small groups to gain more information of the different children and keep the session short (30 to 40 minutes).

Participants

5 Children participated in three context mapping session. The first session was conducted with two boys (7 and 10 years old) and a girl (8 years old). Within the second session one boy (10 years old) participated. The last session was conducted with another boy (8 years old). The participants were approached through an athletic club.

Set up

A week before the session the children received a sensitising booklet (figure 26) which they filled out during the 5 days before the session. The sensitising booklet was used as preparation for the session and as guidance during the first part of the session. Introduction: During the introduction I introduced myself and the project and the children introduced themselves by using the first page of the booklet. Discussing booklet: The children were asked to explain what they wrote down in their booklet with regard to what they liked to do and which moment they liked the most at school. Drawing activity: The children had to choose a less pleasant moment of the day and had to come up with ideas to make that moment more pleasant. After the children finished their ideas, they were asked to present it to each other.

Analysis

Based on the transcripts of the session statement cards were made and clustered into insights.

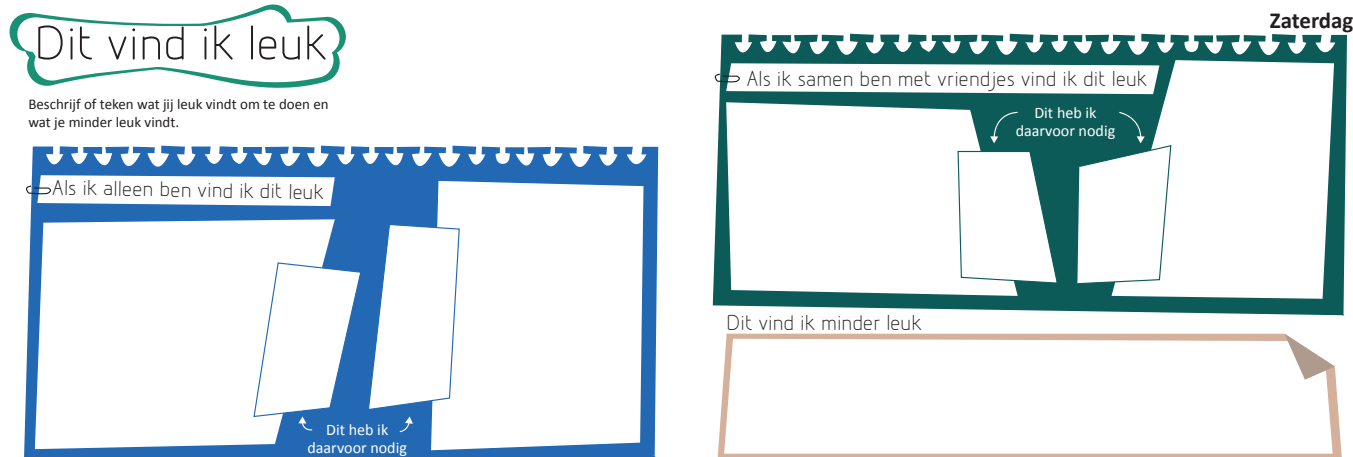


Figure 26: Example page of the sensitising booklet

B.14.3 Results

Figure 27 presents the results of the context mapping sessions.

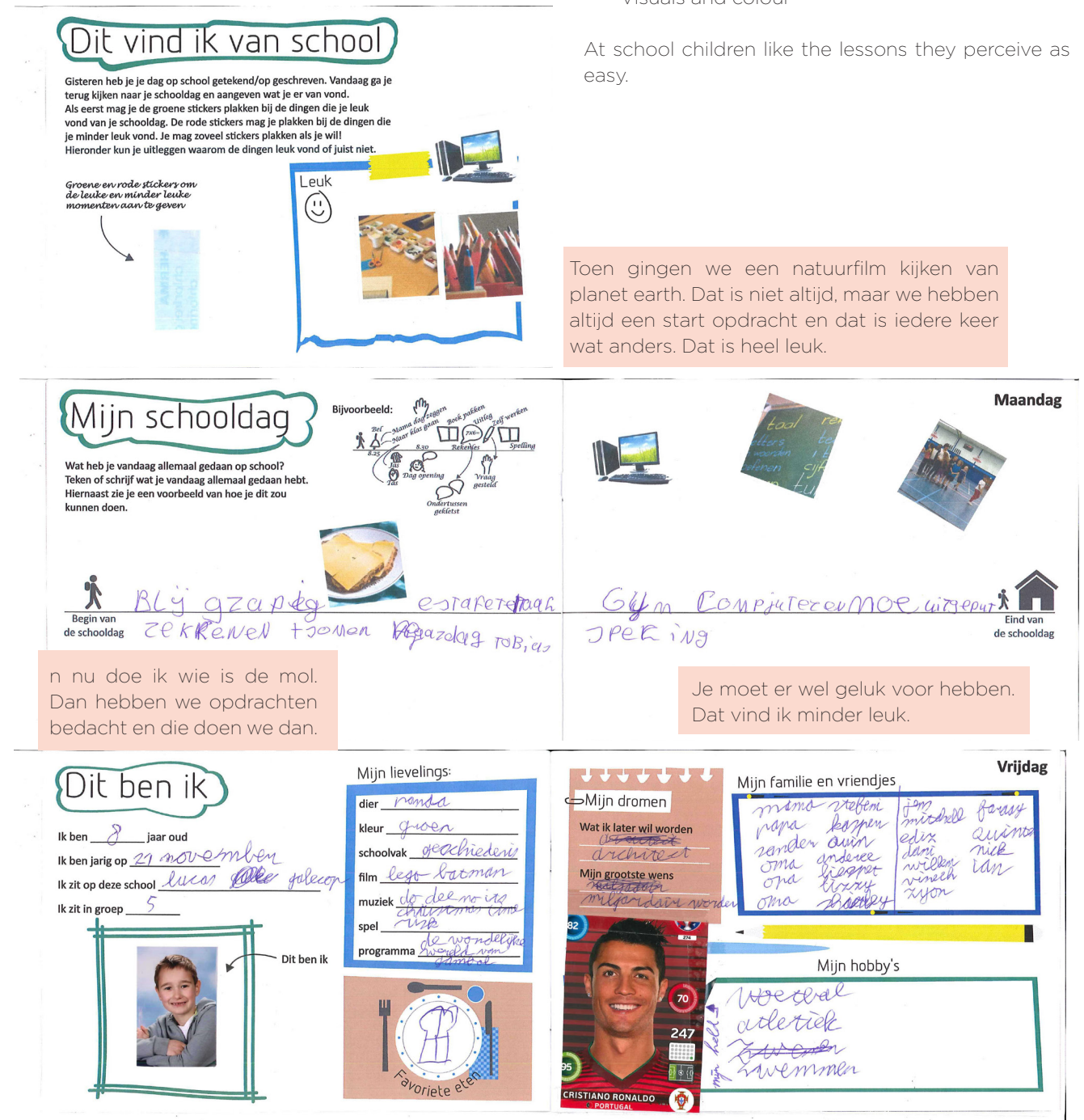


Figure 27: Summary of the results of the context mapping sessions

B.14.4 Conclusion

Elements what children like about products:

- Physical or mental challenges
- Supporting creativity and fantasy
- Humor
- Visuals and colour

At school children like the lessons they perceive as easy.

Toen gingen we een natuurfilm kijken van planet earth. Dat is niet altijd, maar we hebben altijd een start opdracht en dat is iedere keer wat anders. Dat is heel leuk.

B.15 Interview: Differentiation

Chapter 2.10 explained what differentiation is and how it is applied. This is based on the interview with a primary school teacher.

B.15.1 Goal

The goal was to gain insight into a day at school, how teachers differentiate, and how the existing methods can be used within the product/service.

B.15.2 Method

A 1 hour interview was conducted with a primary school teacher of group 3. The interview was conducted by phone, due to which it was not possible to use any visual tools.

The interview consisted of three parts, which are explained below with several example questions.

Day at school

After the introduction questions were asked about how the day at school looks like and how she experienced it.

- Hoe ziet een gemiddelde schooldag bij jullie eruit?
- In de lessen die je geeft, zit daar een structuur in?
- Wat zijn de drukke momenten op een dag?

Goals

Questions were asked to gain information about the goals of a lesson, to be able to design the cards in a way it fits the existing method.

- Bedenk je de lesdoelen zelf?
- Communiceer je je doelen naar de kinderen? Zo ja, hoe?

Differentiation

The last part consisted of questions about how she applies differentiation within the class.

- Bij welke vakken pas je differentiatie toe?
- Heb je ook extra material wat je kun geven in specifieke gevallen als kinderen iets moeilijk vinden?
- Wat vinden klasgenoten ervan dat sommige kinderen iets anders hebben?

B.15.3 Results

A summary of the results is shown in figure 28.

"Specifiek een extra werkblad doe ik eigenlijk niet als kinderen iets moeilijk vinden iets moeilijk vinden."

"Bij andere vakken pak ik het ongeveer op dezelfde manier aan, hierbij zijn alleen geen aparte boekjes per niveau."

"In de methode van leren lezen wordt automatisch differentiatie toegepast."

Figure 28: Summary results about differentiation

B.15.4 Main insights

- Teachers differentiate even if the method does not provide tools to differentiate.
- Teachers have often no or only a very short break during the day.
- The linguistic and mathematic courses are done in the morning, while the social lessons are scheduled in the afternoon. Children are better able to concentrate in the morning.
- During individual work the teacher has time to work with individual pupils.
- Teachers learn to communicate the goals to the pupils, which are often provided by the method.
- Method work with three groups to differentiate, children know themselves to which group they belong.
- Some children are jealous if children with special needs get something extra to support them

B.16 Evaluation: Preliminary Concept Proposal

As presented in chapter 4.2 a preliminary concept proposal was made and evaluated. This appendix shows the evaluation of this preliminary concept proposal.

B.15.1 Goal

The goal of this evaluation was to gain insight into the strong, but mainly weak elements of the preliminary concept proposal and validate the assumed made within the design. Based on these insights the preliminary concept proposal was optimised to the concept proposal.

Weak elements

'Misschien kun je ook iets inbouwen zodat kinderen kunnen inschatten wat ze zelf denken af te krijgen van de taken, is dit 80% of 100%? Dit geeft kinderen ook een stukje controle en ruimte. Niet altijd hoeft alles helemaal af te zijn, soms is 80% ook helemaal goed!'

'Het hoeft niet in laatste, je kan dit ook voor hele klas gebruiken, niet alleen zieke leerling heeft last van emoties, waarom niet iedereen in klas zo'n blokje? Een Emotiewijzer, 'hoe gaat het met jou vandaag' is altijd goed voor iedereen, dan hoeft het ook niet stiekem in laatste, zo maak je ook de verbinding tussen de individuele leerling en het groepsproces'

'Hoeft helemaal niet digitaal of heel groot, kan ook veel simpeler. Dan maak je het ook laag in kosten en kan je het voor iedereen beschikbaar maken'

'Ik denk niet dat het dusdanig een grote rol moet hebben dat docent dan alle blokjes in te gaten houden. Maar leerling hebben dan wel een mogelijkheid om een stukje van zichzelf te laten zien en dat dat invloed heeft op hun leerproces. Kinderen kunnen elkaar ook steunen en mediator zijn voor elkaar. Als je bij je buurman ziet dat hij niet lekker in zijn vel zit kunnen ze ook elkaar supporten.'

'Je emoties die je hebt gekozen zijn heel relevant, wel veel negatieve emoties, als tegenhanger zal je kalm of rustig kunnen toevoegen.'

'Ik zou de applicatie eventueel weglaten, het word wel heel complex dan.'

B.15.2 Method

The elements of the preliminary concept proposal were visualised in detail and presented to the EF consultant of the WKZ. Based on these visualisation her opinion was asked, for example about:

- storing the block in the drawer of the child
- the application
- differentiation the goal

B.15.3 Results

An overview of the results is visualised in figure 29.

Strong elements

'De wijze van uitwerking vind ik heel erg leuk. Dit kan echt positief bijdragen aan welzijn en beeldvorming wat het zieke kind kan doen.'

'Dit zijn ook wel methodes die vaker gebruikt worden in het onderwijs. Om in te schatten wat ze zelf kunnen, etc. Nu dan alleen gekoppeld aan zieke kind.'

'Ik zie jou idee ook voor vriendjes in de klas goed werken. Die hebben ook emoties, en ziekte heeft ook impact op hun, daar kan dan ook meer begrip en inlevingsvermogen voor zijn.'

'De vorm vind ik erg tof. Dat je het echt richt naar het kind zelf. Onderkant richting docent, en gebogen kantje richting het kind, die uitwerking vind ik heel gaaf. Zeker vergeleken met de reguliere dobbelsteen'

'Het Kind moet wel hun doelen behouden, natuurlijk hoeven ze minder, maar moeten ook hun goals hebben, net als ieder ander. Dat kan hiermee goed. Het leuke van jou uitwerking vind ik dat je nog veel kanten op kunt, functionaliteit is top. Ik vind het echt leuk bedacht.'

'Ik denk dat het als het een methode word die gewoonlijk word in gebruik, kinderen makkelijker hun emoties durven te laten zien. Je hoeft niet altijd blij te zijn'

Figure 29: Summary results of the evaluation of the preliminary concept proposal with strong and weak elements

B.17 Evaluation: Mood Visualisations

B.15.4 Main insights

The most important elements to improve are:

- **The system is very complex:** The preliminary concept proposal exists of three elements with all multiple, and even unnecessary, functions. Especially the functions of the application are too much and not needed. The main function of each elements is identified and used to simplify the preliminary concept proposal.
- **Impersonal:** The application takes over the interaction between the teacher and child. This makes the preliminary concept proposal impersonal which could affect the relation between the child and teacher negatively. The product/service must support the communication and create a feeling of safety and trust.
- **Secret is more interesting:** The block of the child is placed in his drawer. To change the mood or energy level, the child should do this secretly. This will probably attract attention of the classmates, which is not intended. It is also possible to give all children a block, since they all coop with emotions.
- **Energy level is too abstract:** The mood is visualised with colour and a facial expression which is clear for children. The way of expressing energy level is very abstract and children are probably not able to show this using the preliminary concept proposal.
- **Do not differentiate goal:** The goal for the sick child is the same as for his classmates, since the child should reach the same level. Therefore the goal should not be differentiated, but for example tasks and time (the road to reach the goal).
- **Involve the classmates:** It is not about only the teacher and sick child, but as well the classmates and the sick child.
- **Balance pleasant and unpleasant mood:** There are 3 negative emotions and only 1 positive, there should be an balance.

Within the 'Gevoelens medaille' 6 mood states are visualised. A small research was conducted about these visualisations.

B.17.1 Goal

The mood states are made by myself with inspiration of a variety of visuals. The recognisability of the visualisations was questioned. Therefore a small research was conducted.

B.17.2 Method

21 Participants (4 males and 17 females of a diverse age) were asked to indicate which mood they thought were presented. 10 Participants received the visualisations of the girl (figure 30) and 11 participants received the visualisations of the boy (figure 31). The order of the mood states was different for the boy and girl version to eliminate the effect of the order of the visualisations.

B.17.3 Results

Figure 30 shows the results of the visualisations of the girl and the intended mood. Figure 31 shows the results of the visualisations of the boy and the intended mood.

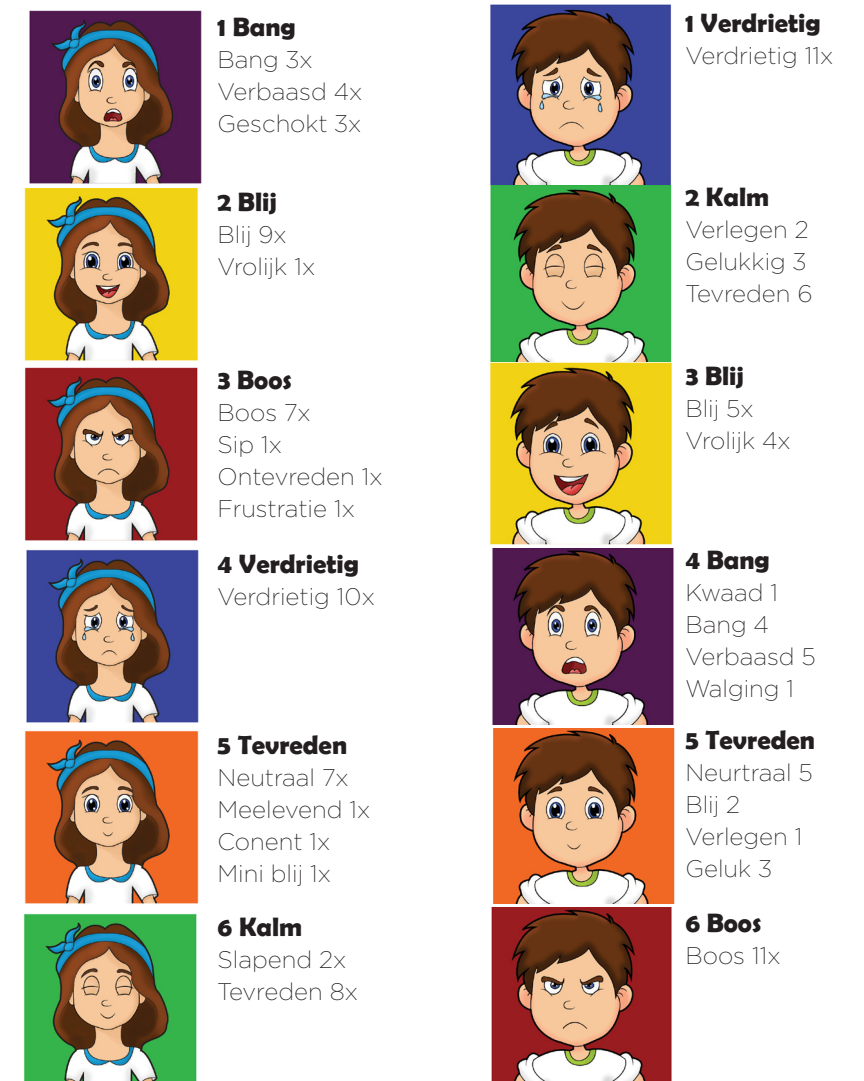


Figure 30: Results mood state visualised with girl

Figure 31: Results mood state visualised with boy

B.17.4 Conclusion

Based on these results it was concluded that there are no relevant differences in the recognisability between the visualisations of the boy and girl. For both versions the mood state afraid was not clear and often seen as surprised. Therefore this visualisation is adapted. Furthermore, most participants indicated it was difficult to indicate the mood states relaxed and satisfied. However, most participated indicated the intended mood state, however recognised them in the other visualisations. Therefore it was decided to switch the facial expressions of these mood states.

C Stakeholders

In chapter 1.4 an overview is shown of the stakeholders involved in the sick child's care. As visualised multiple people are involved in the education of the child. These people have some similarities, however also essential differences, which is described in this appendix.

C.1 Teacher

The teacher of the child at the home school is responsible, together with the school, for ongoing education for the child. The teacher should provide the other education givers with suitable education materials and communicate what the child is expected to do.

C.2 Internal Counsellor

The Internal Counsellor (IC) is an employee of the home school who is responsible for the support for children who need extra care, which includes children with cancer. Not all schools have an IC, but in general larger schools have an IC full-time or part-time. An IC is a teacher who followed extra education or a specialised person in learning and behaviour of children.

The tasks for the IC for a child with cancer are to maintain the contact with the parents and teacher(s) of the child (and optionally the EF), create an education plan for the child, and take care of the extra support needed (L. Hendriks, personal communication, December 20th, 2016). The extra support can be given by the IC or the IC could purchase extra support from other parties. When there is no IC within a school these tasks are mainly done by the teacher of the child.

C.3 Home teacher

The home teacher is the person who educates the child at home. This person could be the same as the teacher of the child at the home school or the IC. When it is not the same person, the home school is responsible for finding a home teacher and what the home teacher will teach the child.

C.4 Educational Facility Consultant

An Educational Facility (EF) is available in all University Medical Centres in the Netherlands as well as in the PMC. The EF makes it possible for children to get education in the hospital if they are hospitalised for a longer period of time (in general 10 days or more) or if they are frequently hospitalised (Het WKZ, 2017).

The EF consultants educate the children individually or in small groups based on the materials provided by the home school of the child. If the child is hospitalised for a longer period of time, EF consultants provide the home school with information about the child and disease and they advice the home school about the education plan for the child.

Next to this, the home school can always contact the EF consultants for questions or advice (L. Jansen, personal communication, November 28th, 2016). The EF is only involved when the child is hospitalised in the hospital in which the EF is located. (I. Van de Venne, personal communication, November 28th, 2016).

C.5 Consultant (EAO)

Consultants of the Education Advice Office (EAO) work for the government, under the organisation Ziezon, and help schools with the education for sick children. Schools or parents can contact them for help and advice (Ziezon, 2017). After contacting the EAO, a consultant is assigned to the child, which can support the child and schools throughout the child's complete school career (T. Van Roosmalen, personal communication, January 5th, 2017). The consultant (EAO) can help creating the education plan and can help in giving or arranging extra support, such as home schooling or the KPN klasgenoot (Ziezon, 2017).

D Acute Lymphoid Leukaemia

This appendix elaborates on cause, types, and level of risk within the treatment of ALL.

D.1 Cause

As stated in chapter 2.1. the cause of childhood cancer remains unclear. What became clear according to recent research is that in general childhood cancer is not genetic, however there are a few types which are genetic (VOKK, 2016a). Next to this, the factors that increase the risk of cancer by adults, such as smoking or nutrition, do not have an influence on childhood cancer (Kanker.nl, 2016a). Currently research is done to investigate the cause or influences on the cause

D.2 B-cell and T-cell ALL

ALL can be divided into two categories: 1) B-cell ALL and 2) T-cell ALL. The difference between these two categories is that within T-cell ALL the lymph nodes are enlarged which does not happens by B-cell ALL. Due to enlarged lymph nodes the children sometimes need to be treated with radiation as well. The rest of the treatment of B-cell ALL and T-cell ALL is similar. (Hematologie Groningen, 2014). Therefore there was not made a distinction between those types of ALL within this report.

D.3 Level of risk

Children diagnosed with ALL are categorised into three groups based on the response to the chemotherapy on the 33th and 79th day of the treatment (SKION, 2016). Below the levels are explained in which the difference between treatment and survival rate are indicated.

D.3.1 Standard risk

The first group is the standard risk (SR). The reaction of those children to the chemotherapy is already high after the 33th day of treatment (SKION, 2016). These children will follow a treatment of 2 years with a lower dose of medication. The survival rate for those children is 95% (SKION, n.d.).

D.3.2 Medium risk

The second group is the medium risk (MR). Those children had a positive reaction on the chemotherapy only after the 79th day of treatment (SKION, 2016). Depending on the genes of the child a treatment of 2 or 3 years need to be followed. The survival rate for those children is 70% (SKION, n.d.).

D.3.3 High risk

The last group is the high risk (HR). Those children do not had a positive reaction after the 33th nor 79th day of treatment (SKION, 2016). Therefore the children have to undergo a highly intense treatment for 2 years. The survival rate is 75% (SKION, n.d.).

D.4 Symptoms & effects

Below an overview is given of possible symptoms of ALL and side and late effects of its treatment.

D.4.1 Symptoms ALL

The possible symptoms of ALL are (kanker.nl, 2016c) (UMC Utrecht, 2017):

- Reduced resistance which could result in infections and fever
- Fatigue
- Looking pale
- Anemia
- Spontaneous bleeding and bruises
- Dizziness
- Shortness of breath or palpitations
- Black spots in the eyes
- Haemorrhage
- Bone pain
- Enlarged lymph nodes
- Pain in the belly caused by an enlarged liver or spleen
- Fever

D.4.2 Side effects treatment

The side effects of the treatment depend on the treatment and the physical health of the child. The following side effects are common for a treatment for ALL (Kanker.nl, 2016d) (Smith & Philips, 2012):

- Hair loss
- Nausea
- Diarrhea
- Fatigue
- Painful mouth
- Skin reaction
- Mood swings
- Hunger or lose of apatite
- Smell and taste changes
- Problems with the fine motor skills

D.4.3 Late effects

Just like the side effect are late effects depending on the treatment and the physical health of the child. The late effects can arise directly after the treatment, but also years after the end of the treatment. The following late effects could arise of which the last 3 could arise over long term (kanker.nl, 2016d):

- Numbness in the hands and feet
- Decreased muscle strength
- Decreased memory and concentration
- Growth disorder
- Higher risk on getting cancer
- Infertility

Next to these physical effects children will experience cognitive and psychological effects during and after the treatment as well. Chemotherapy can affect the concentration of the child and by missing school the child can develop arrears at school. The psychological effects are for example coping with emotions as fear, insecurity, powerless, loneliness; dealing with the pain of the treatment and examinations; and dealing with his change living environment. (Van Schoors, Goubert & Verhofstadt, n.d.)

D.5 Double Protection

The law of double protection means that a person is protecting himself by protecting the other (Grootenhuis & Last, 2006). Children for example do not tell their parents if they are not feeling well to not give their parents a negative feeling with which the child does not want to be confronted. By protecting his parents from his problem, the child protects himself from the emotions of his parents. Parents and siblings use this law of protection as well. It can be seen when there is created a more positive image of the child, communication is avoided, or the reality is distorted. (Grootenhuis & Last, 2006)

D.6 Control

Last & Grootenhuis (1998) identified four control strategies:

Predictive control: Gaining knowledge

Vicarious control: Trying to imitate/ manipulate or associate with powerful others

Illusory control: Influence or associate with change-determined outcomes

Interpretative control: Understanding problems to solve or master them

All these strategies are used by parents and children to cope with cancer and its treatment.

This appendix elaborates on cause, types, and level of risk within the treatment of ALL.

E.1 Survival rate

The survival rate of ALL is 75-95%, however people estimated this survival rate much lower. The average estimated survival rate according to my questionnaire was 44%. This estimated survival rate is even lower than the survival rate of cancer by adults, which is around 62% (Integraal Kankercentrum Nederland, n.d.). People tend to think a child will not survive cancer, while most children do.

Children also tend to think a child with cancer will die. During the interviews the teachers mentioned that one of the first things classmates ask, is: "Will he/she die?". One of the teachers mentioned that most children have seen the movie '8ste groepers huilen niet' and compare the situation with that movie. Within the movie a girl is diagnosed with cancer, but despite the treatment she passes away. Due to this worries and fears could arise.

E.2 Contagious

Ignorance could lead to the misconception that cancer is contagious. Multiple participants mentioned during the interview that some people think cancer is contagious. The people who thought it was contagious were mostly low educated, or no Dutch speaking people with a non Western background. This could result in excluding and dodging the sick child.

Mother of a survivor

'One of the friends of my other son did not come to our house to play anymore. His mother was afraid her son would get cancer as well. Even after I explained cancer is not contagious.'

E.3 Healthy after treatment

The most common misconception is that a child is/feels healthy after the treatment. Children forget sometimes a child is sick if they cannot see it. This occurs most often at the end of the treatment and after the treatment. But adults also tend to think that a child is healthy after the treatment. However after

the treatment the child is still recovering from the treatment physically and mentally.

According to my questionnaire people do take the mental part into account, but forget the still present physical side effects or late effects of the cancer treatment. Due to this there is a lack of empathy for the sick child.

E.4 Seriousness of the situation

Children do not always understand the seriousness of the situation. Especially younger children do not understand the difference between cancer and a regular flu which they have had themselves once. This could result in a lack of empathy for the sick child.

E.5 Projection own experiences

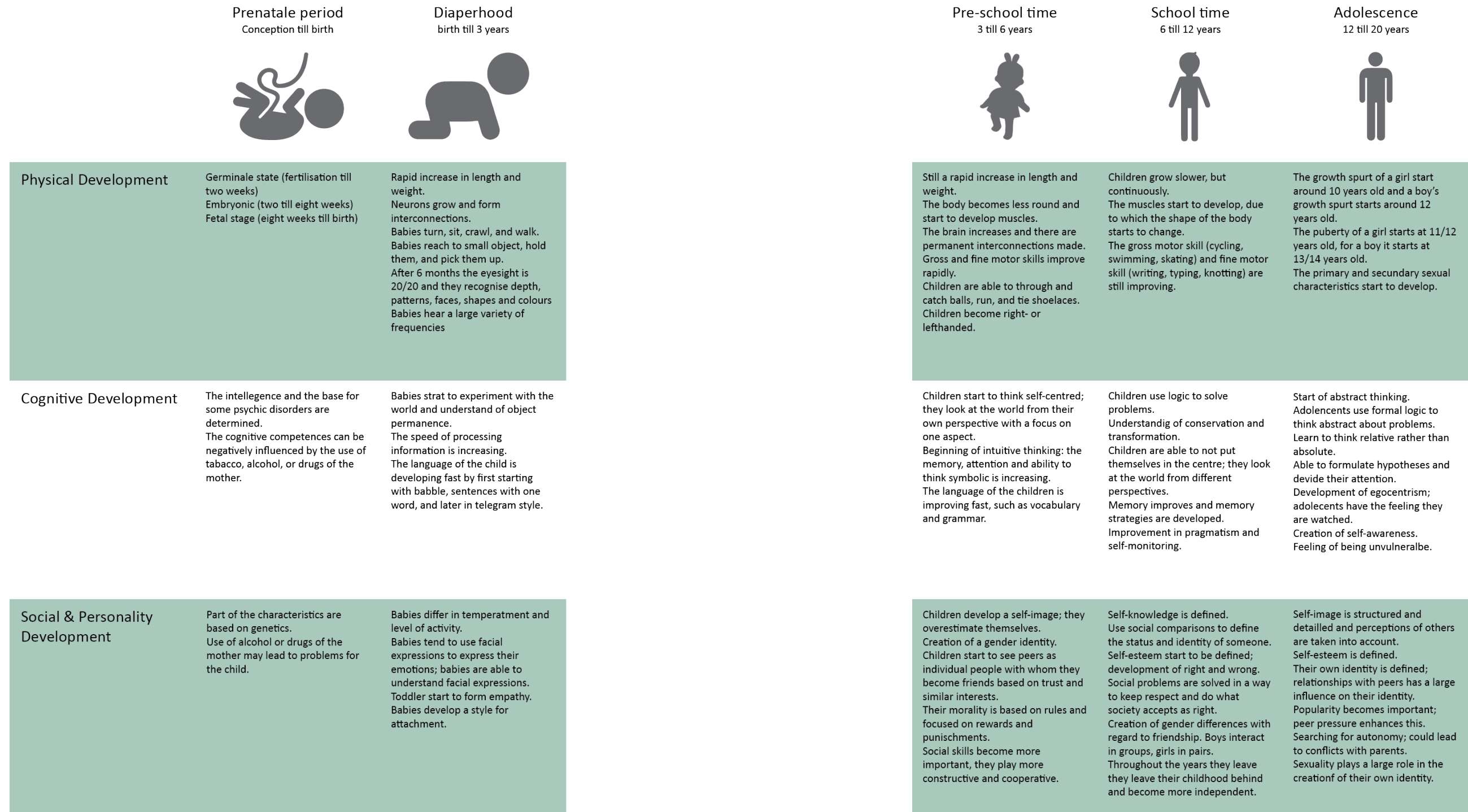
The child psychologists explained that adults tend to project their own feelings, emotions, and experiences on children with cancer. However children cope differently with cancer than adults and are much more flexible than adults, due to which feelings and emotions children have are different from adults. If adults project their own experiences on children they may not see how the child is really feeling. Especially in the school context, children do not feel sick. They are very happy that they are able to go to school, which is one of the few places which feels for them normal, like before the diagnoses.

E.6 Underestimating

Related to the previous misconception, adults tend to underestimate a child with cancer. According to the questionnaire people expected only 50% of the children will pass to the next year at school, while almost all children will pass the year. Teacher also tend to underestimate a child, which could have a negative influence of the self confidence of a child.

F Regular Child Development

Chapter 2.2 presented an overview of the development of children aged between 6 and 12 years old. This appendix gives an overview of the complete child development from the prenatal period till adolescence (20 years old) (figure 32). An overview of the complete child development helps to understand the ongoing development and the influences on arrears in the development.



Based on the overview of Feldman (2010)

Figure 32: Overview of the regular child development from prenatal to 21 year old

This appendix elaborates on the effects of cancer and its treatment on the child development as presented in chapter 2.4. For each aspect of the development it is explained which and how each element is affected and how the aspect is stimulated to develop.

G.1 Physical

During school time children grow continuously till their growth spurt. Girls have their growth spurt between 10 and 14 years old and boys around the age of 13 (CJG, n.d.). Children with cancer are likely to grow slower and start their growth spurt later. The treatment and its side effects influence the weight and appetite of the child, due to which children will lose or gain weight.

The gross and fine motor skills will develop also slower, since these skills develop by training. Due to the side effects of the cancer and its treatment, such as fatigue or bone pain, the child is not able to practise these skills and thus develop them. The children are stimulated to follow physiotherapy to develop the gross and fine motor skills.

G.2 Cognitive

The cognitive development is mainly affected by the absence of school/education and side effects of the cancer and its treatment which affect the capability to learn. Due to the chemotherapy and the medication children have more difficulties to remember things and concentrate (van Riel, 2013). The child is not able to develop and practise memory strategies and the child is not able to practise problem oriented thinking. This could improve after the treatment, but for most children this will result in a late effect which can still be a problem years after the treatment (van Riel, 2013).

To minimise the effects on the language and calculation development of the child during the treatment, education focuses on these skills. In practise this means that a child with cancer gets support at home, in the hospital and individual coaching for the basic courses (language, grammar, reading, and calculations). At school the child will follow the regular education as much as possible. Due to the support at home and in the hospital the language and calculation development is minimal

affected and most children are able to reach the minimum goals to transfer to the next year at school.

G.3 Social & Personality

Children undergo an enormous social and personality development during school time and especially at the targeted age group (8-10 years old).

First of all children start to create a self-image. They are able to describe themselves not only based on their physical characteristics but as well on their psychological characteristics. The children do this compared to their peers (MP, 2009-2016). The self-image they create at this age has a large influence on the self-image of the rest of their lives. At the same time children feel a need for success and belonging, they want to fit in the group. As a consequence peer pressure starts and groups will be formed. Around this age children also start to make friends based on trust instead of similar behaviour. At this age it is important for a child to be around peers to be able to undergo this development. However a child with cancer is not able to be around peers and participate in the group activities as much as regular children.

Next to this, a child with cancer comes faster mature (Kupst & Bingen, 2006). As a result a child with cancer can feel lonely and not belonging to the group. Children are also much more aware of the physical changes and limitations, such as loss of hair or reduced energy. This could result in a negative self-image.

Furthermore children want to become independent, for example walking or cycling to school by themselves. A child with cancer will become more dependent from his parents.

At last children learn at the age of 8 that they are not the centre of attention. However when a child becomes sick, they will become the centre of attention. They will get more attention from their parents, in the hospital, and they get gifts. Due to this children do not learn to not be the centre of attention. Which could become problematic after the treatment.

In 1981 the "Law for primary education" was adopted (Overheid, n.d.a). This law describes amongst other things that schools are obligatory to provide their pupils with continuous education and the primary goals for development are listed. The law states (Overheid, n.d.b): "Primary education stimulates a broad education of children. The education is focussed on emotional and intellectual development, the development of creativity and obtain social, cultural, and physical skills." The primary goals make these aims measurable.

The categories of the primary goals are (Overheid, n.d.b):

- **Dutch:** Oral skill, writing skill, and linguistics
- **English:** The basic oral and writing skills
- **Calculation/Mathematics:** Mathematical understanding, counting numbers, and geometry
- **Orientation on you and the world:** Human, community, nature, technique, space, and time
- **Artistic orientation:** Use art to express themselves, reflecting, and appreciate culture
- **Physical education:** Basic form for movements and games and playing respectful

All schools should endeavour these goals for all their pupils.

I Trends & Developments

Chapter 2.3 showed the most relevant trends and developments within the primary school context. This appendix gives an overview of all founded trends and developments. The DEPEST method is used to find trends and developments on different aspects. The categories from DEPEST are used to present the results of the analysis below. The trends/developments presented in bold were already presented in chapter 2.3.

I.1 Demographic

Increase amount of children with special needs: Due to new technologies and knowledge it is possible to recognise and treat abnormalities earlier which is one of the causes of more children with care in a regular classroom (De Argumentenfabriek, 2010). Next to this, it is currently advised to keep children as long as possible on a regular school, while children before were advised to go to a special school.

Decrease school population: The amount of children who follow primary education is decreasing. This decrease is mainly visible in the rural areas. In the Randstad the population remains similar. (De Argumentenfabriek, 2010)

School population more heterogeneous: The amount of children who are not originating from a Western country is increase (De Argumentenfabriek, 2010). This, together with the increase in children who need care, makes the school population more heterogeneous.

Schools differ more: Schools start to differentiate more from each other (De Argumentenfabriek, 2010). A good example is the difference between religious schools and the public schools.

Decrease amount of primary schools: This development is related to the decrease of the school population. Due to decrease of pupils, schools have to merge or close mostly because of financial problems. (PBL, 2016) Next to this, community schools are becoming more popular.

I.2 Economical

Schools cooperate with other institutions: Schools are working more and more together with other institutions such as day care (De Argumentenfabriek, 2010). One of the reasons is related to finance.

Teachers become scarce: The amount of teachers

is decreasing, which makes them scarce (De Argumentenfabriek, 2010). Due to this it becomes harder for school to find competent teachers which fit their school.

Multidisciplinary school personnel: More school try to create a multidisciplinary school staff. They for example hire intern counsellors, academically educated teachers, or external personnel. (De Argumentenfabriek, 2010)

Increase workload for teacher: More teacher in primary education indicated a too high workload. (Nu, 2016)

I.3 Political

Higher teacher requirements: The Dutch government request higher requirements for teacher. One of the implementations of this development is improving the education to become a teacher. (De Argumentenfabriek, 2010)

Higher school requirements: The Dutch government request also higher requirements for schools. An example of the implementation of this trend is the duty for schools to take care of children with difficult education or care related requests. (De Argumentenfabriek, 2010)

More attention for education results: The Dutch government focuses more on the education results the pupil have per school.

I.4 Ecological

Nothing found.

I.5 Social

Focus on personal development: School tended to focus on the development of a complete group of children and forget to look at individual children.

Personal development is becoming the starting point for education (Platform onderwijs 2032, n.d.).

More attention for social and emotional skills: Schools focused on the cognitive development of children, but it is seen that schools pay more and more attention on the social and emotional development of the children (Platform onderwijs 2032, n.d.).

Options for extra education: Especially in the Netherlands, people prefer and expect to act normal. Children who were able to do more than the regular work did not get the possibility to do more. Nowadays people start to change that idea. It can be seen at universities who introduce honours programmes, but also in primary school. Primary schools start to offer the children the possibility to broaden or deepen their learning experience (Platform onderwijs 2032, n.d.).

Implementation of the 21st century competences: A research was conducted to investigate which competences children should learn to prepare them for the labour market of the 21st century. According to this research the competence the children learn currently at schools does not suit with the needed competences, therefore they formulated five clusters of competence which suit better. The five clusters are: personal responsibility; way of working; way of thinking; information, media, and technology; and civilisation (Remmerswaal & Voerman, 2016). Currently schools are slowly trying to adapt their education plan with taken these clusters into account.

Increase in rewarding: A reward system is upcoming. Schools for example give children the possibility to earn badges of microcredit which they can for example use to get nicer products or more time to do fun things (Lucassen, 2015).

Medical ethics becomes more important and more complex (De Argumentenfabriek, 2010): This trend can be seen in the Netherlands and has an influence on schools as well. Due to the changing medical system school has to take medical ethics more into account, which is difficult since it became more complicated.

Results become more important: Teachers measure more often the capabilities of the children and the

results of these tests are used to judge the children (De Argumentenfabriek, 2010). This trend can be seen outside the school context as well.

People want to differentiate more: People try to form an own identity by differentiate from other people (De Argumentenfabriek, 2010).

More informal society: The society becomes more informal (De Argumentenfabriek, 2010). The edges of informal and formal are fading away. In the school context this can be seen in the situation that children see their teacher as well authority than years ago.

Primary school fulfils also a social function: School is not only a place to develop the cognitive skills of children, but it is also a place for social activities (De Argumentenfabriek, 2010). School are becoming more aware of their social function and this social function is become larger/more important as well.

Differentiation in the classroom: Currently working differentiated at primary schools becomes more and more important. Differentiation means adapting education to the level differences of the pupils to support to work on different levels. This is needed due to the more heterogeneous school population. (Interviews, appendix B.)

I.6 Technological

Increase in cloudcomputing: Cloudcomputing is the collective name for all information and communication technologies available via the internet. Due to cloudcomputing it is possible to get safely access to all digital education materials and tools at any time at any place. 15 Years ago the name cloudcomputing was introduced, since then it become more and more popular. Currently it is used in homes, offices, but also school. (Kennisnet, n.d) It is expected that in a few years most schools will have the possibility for cloudcomputing.

Bring your own device (BYOD): Due to the introduction of laptops, tablets, and smart phones it became possible to bring easily an own device to work or school. The price of these devices is decreasing, which makes it for a large group of people accessible. Next to this, digital education materials and tools are developed which makes it, together with cloudcomputing, possible to have

J Taking Care Of A Child With Cancer

via a device access to these materials. For teachers more and more application are developed for the organisation of the education, which they can use via their own device. A personal device gives the user the possibility to be mobile and flexible. Currently there are already school who use a personal device, such as the ipad schools, but it is expected that more school will make use of a personal device. It is unclear how fast school will make that change. (Kennisnet, n.d.)

Increase in network Infrastructure and internet connectivity: To be able to make use of cloudcomputing and the personal device internet is needed. (Free) wifi is upcoming, not only at public spaces, but also in schools. (Kennisnet, n.d.)

Increase in big data and learning analytics: Learning analytics is the use of big data. Currently data is already gathered in large amount, however this is done mainly manually which results in mistakes. It is expected that with the increase in digital learning, more data will be gathered. This data can be used to improve the education, but also to get a better insight in individual pupils. It makes it possible to keep track of the progression of the pupil and identify possible problems. (Kennisnet, n.d.)

Increase in adaptive digital education materials: Adaptive digital education materials are digital learning materials/tools which are able to adapt to the individual pupils. It gives the pupil a dynamic learning experience which makes it more effective and efficient. Next to this it motivates the pupils. (Kennisnet, n.d.) There are already materials like this developed and it is expected that much more will be developed.

Personal learning environment: Due to digital education materials and blending digital and physical learning, education is less depending on time and location which makes it possible to create a personal learning environment (Kennisnet, n.d.). More school try to create a personal learning environment for their pupils.

Focus on digital ethics: The increase of the use of technology increased the awareness of digital ethics (Kennisnet, n.d.). Also in school technology can have a negative result or influence, which makes the ethics even more important. It is expected that schools will have a great influence on the education of digital

ethics.

Wearable technology: The smart watch is one of the first example of wearable technology. One of the possibilities of wearable technology in the school context can be a device which helps children to understand emotions of classmates. (Peeters, 2016) Wearable technologies is upcoming and it is expected that it will be upcoming in the school context as well.

Making: Learning by making is already popular in America and is upcoming in the Netherlands. There already exist some school who design their education on the principal of making. Another implementation of this trend can be seen in the upcoming makerspaces, which are areas within schools where they can build or new courses related to making things. (Peeters, 2016) This trends is a consequence of the development of rapid prototyping, such as 3D printing (Lucassen, 2015).

Gamification: Gamification means implementing game elements in learning. Gamification is a development which started a few years ago and it is still being used more and more in schools, but also in other contexts.

Personal web applications: More and more personal web applications are developed. These applications make it for example possible to keep track of the individual progression of a child. (Kennisnet, n.d.)

Trends/developments which could become more popular over a longer period of time

Internet of things (IoT): The internet of things is currently very popular. It could be implemented in school buildings by creating intelligent school buildings. (Kennisnet, n.d) It is expected that this will take much more years before it becomes reality, however a start is already made with for example the smart boards.

Social robots: Robots were initially designed to be used in factories. Later the robots were implemented in the house and currently social robots are being developed. (Kennisnet, n.d.)

Use of biotechnological substances: New biotechnologies make it possible to improve the learning performance. It is not yet used, but it could be used over many more years

Below more information is presented about how school take care of children with cancer. The process is divided into the treatment phases.

J.1 Diagnosis & Induction

After the child is diagnosed with cancer, the parents should inform the school about the situation. In general, parents contact the teacher of their child. During this contact moment it is important for the school to determine how the child is doing and what the family can expect the coming time. The information given to school depends on how much the parents want to share, however schools can respond more suitable if they have more information.

Afterwards the first agreements will be made, which information will be shared with whom, how and with whom wants the family to communicate, and what do the parents expect from school. (van Roosmalen, 2012) The communication is for both parents and teachers experienced as difficult and a barrier (Moore, Kaffenberger, Goldberg, Oh & Hudspeth, 2009) (Prevat, Heffer & Lowe, 2000). For teachers it is difficult to decide when they could contact parents and it is difficult if the parents do not want to share much information and they receive inconsistent information. For parents it is often difficult to explain what happens to them and their child and it is frustrated if they have to repeat giving information (appendix B).

If the parents and child are ready, the rest of the school will be informed. First of all the school personnel will be informed. This will be done by the contact person of the family or the family can give a presentation themselves (van Roosmalen, 2012). Classmates of the child will be informed and parents of the classmates receive a letter with an explanation of the situation. It is advised to inform the parents of classmates as well, to prevent gossips and unpleasant situations (van Roosmalen, 2012).

At last, the school should arrange the education for the child and the financial support. They can get help from several organisations in for example creating the education plan. The education plan describes how the school will educate the child and which goals the child should reach.

J.2 Consolidation & Maintenance

After the diagnosis, the treatment will start quickly. The child has to adapt a new situation which mainly exists of the hospital and being cared for instead of being at school and with friends. If the child is not able to go to school for a longer period of time it is important to involve the child in his class and communicate with the class. (van Roosmalen, 2012) The child can be involved in class in several ways, such as social media, visits, short movies, this will give the child the feeling it is part of the group and feels less isolated. It is important to keep communicating with the class, since the classmates as well want to know how the child is doing (Tollet, n.d.). The teacher also has to communicate to the classmates when the child is not doing well, which could be difficult for teacher as well. Since they also have their own emotions and feelings they cope with (Prevat, Heffer & Lowe, 2000).

If the child will return to school after a longer period of absence, it is important to prepare the classmates and the child on this return (van Roosmalen, 2012). Most children are happy they can go back to school, however they could also feel insecure or afraid to go back (Deasy-Spinetta, 1993). The children are for example afraid of not being accepted by their classmates, they are afraid of being bullied or afraid being not able to keep up with their classmates (Worchel-Prevatt, et al., 1998). This is especially felt by children who have changed physically. For parents it could also be difficult to let their child return to school. The parents are afraid their child will not be accepted (Vance & Eiser, 2002) or will infected by a disease at school (Georgiadi & Kourkoutas, 2010). The parents are used to have the control, which they have to let go when the child returns to school. To

make it easier for classmates to accept the sick child, it is important to inform them about what happened to the sick child and what he is able to do and not to do (van Roosmalen, 2012). This is important to do if the child looks ill, but also when the child does not look ill.

The child will not be able to go fulltime to school. It will have periods of long absence or periods with minimal visits to school. Schools are responsible for continuing education. If the child is hospitalised in a hospital with EF, it will receive education from them based on the education plan made by school. If the child is hospitalised in a small hospital or has to stay at home, the school should make sure the child will be educated with support from the consultant EAO. In practice it tends to be difficult to create this continuous education (appendix B). For example because the EF does not receive in time the education materials from school or there is no home teacher available for the child.

If the child is present at school, the teacher should estimate what he can expect from the child. The child returns to school to develop further, however he is not able to do the same as his classmates. It is important that teachers (and parents) do not under- or overestimate the child (van Roosmalen, 2012). In general teachers (and parents) tend to underestimate the children (Charlton, Pearson & Morris-Jones, 1986), while the children themselves overestimate themselves. They are so happy to go to school and they want to be normal, due to which they tend to put all their energy in school (van Roosmalen, 2012). To prevent this, the time at school should be gradually increased and children have to accept they are not able to do as much as before the diagnoses or as their classmates (Worchel-Prevatt, 1998).

At last, schools should take care for the siblings as well. The enormous impact of the diagnosis cancer on a sibling is often forgotten by schools. Nowadays, schools tend to expect as much from the sibling as before the diagnosis which is not realistic (appendix B).

J.3 After the treatment

After the treatment, schools and children expect everything is "normal" again (van Roosmalen, 2012). However, most children are not able to do the same as they were used to do before the treatment. It is important for school to recognise this and respond to this and give the children the opportunity to find a new balance (which would take months) (van Roosmalen, 2012). During this period, this should be communicated to classmates as well. They tend to forget what happened to the child and may lose their empathy for the child (appendix B).

This appendix is an elaboration on the existing products/services to improve the school experience of children with cancer presented in chapter 2.4. Within this appendix the products/services shown are explained in more detail and an analysis is shown of existing products for autistic children.

K.1 To improve the school experience for children with cancer

An overview of products/services which are currently available to support children with cancer or chronically sick children and their teachers in the school context or could be easily adapted to fulfil this purpose is made to find a gap within the market and served as inspiration.

The products/services are categorised into four categories: connect children with classmates; materials to educate children; materials to support teachers and schools; and applications about cancer. Within the category materials to support teachers and schools and applications about cancer there were much more products/services. The presented products/services are the most common ones used and give a good overview of the variation within the categories.

Below the products/services are presented per category with an explanation and their strong and weak points.

K.1.1 Connect children with classmates

The following four products/services all try to connect the sick child with its classmates to prevent isolation and make it possible for the sick child to be part of school and follow classes.

Webchair

The Webchair is a device which makes use of videoconferencing. The device, which consists of a screen, camera, and audio in-/output, can be placed in the classroom. The sick child can control the camera and communicate via a laptop from home to take part in class. Classmates can see the child on the screen and communicate with the child via a microphone. The device in class is large and depending on electricity. The Webchair can be borrowed for € 317.- per month (exclusive the laptop)

and is developed for children which are not able to attend school for a longer period of time. (Webchair, 2014) The focus of the product is making it possible for the sick child to continue education, but it also makes it possible for the sick child to connect with its classmates.

Make the child feel less isolated and continue education.

KPN klasgenoot

EDventure developed in cooperation with KPN the KPN klasgenoot. This is a product that makes use of smart technology to make it possible for the child, who are not able to be present at school for a longer period of time, to see the class and for the class to see the sick child. The child is able to interact with its classmate and follow the education. The sick child can control the camera and communicate by talking or typing with its classmates and teacher. In class microphones are placed, so the child can hear the people talking in class. Next to this, the child can raise its finger virtually. This should give the child the feeling it participates in class like the regular children do. The device, which is placed in class, is large, but not depending on electricity. (KlasseContact, n.d) The aim of this product is make it possible for children to continue education. A secondary advantage is the social contact of the sick child with its classmates.

Make children feel connected with classmates and prevent an educational lag.

AV1

The AV1 is a social robot developed by No Isolation. NO Isolation is founded by a mother who lost her child due to cancer. During the treatment of her child she experienced the isolation of her child as a mean problem. She wanted to develop something to prevent this isolation and came up with AV1. This is a social robot which should prevent the sick child from isolation. The robot is an avatar of the sick child. The robot can be used in class, so the child can continue education. The robot for example is able to virtually raise its hand. But the robot can also be brought with the classmates. The robot is small and portable,

which invites the classmates to take it along. Due to this the sick child can be part of the social world even though it is not physically with its classmates. The sick child can talk via the robot, see its classmates through the eyes of the robot, and move the head with camera via a phone or tablet. The robot can be leased for €2000,- per year if the child is longer than 6 months absent. (No Isolation, n.d.) (AJ+, 2016) The goal of the robot is to make children feel less isolated, but it makes it also possible for the sick children to continue education.

Make chronically sick children feel less isolated and continue education.

Online media

Online media (such as facebook, blogs, instagram, e-mail) is becoming more popular also for children aged between 8 and 10 years old. Online media is developed to be able to have contact with other people via the internet for pleasure or work. However it can also be used in the situation a child is not able to physically interact with other people. Online media which can be used by sick children to stay in touch their classmates or their teacher. It is available for free and for all people (with internet) and it is directly accessible which makes it approachable for the sick child and classmates/teacher. Online media makes it possible to connect sick children with classmates to prevent isolation.

Connects sick children with classmates and/or teachers.

K.1.2 Materials to educate children

There are materials developed for schools to help teachers educate children about illnesses and cancer. Two organisation have made a box with these types of products which schools can buy or borrow.

EHBZo-koffer

The EHBZo-koffer is based on open communication, creativity, and solidarity. The box exists of books and teaching materials and is accompanied by a website. The EHBZo-koffer is a device for teacher to help them organise the education quick and targeted. The website exists of a general action plan, practical tips and guidelines, example letters, overview of devices and rules, and teaching materials. It is developed for teachers of chronically sick children. (Stichting

Mosaïque, n.d.)

The EHBZo-koffer is a device for teacher to help them organise the education quick and targeted.

Leskoffer

The VOKK created a box with materials to teach children about cancer. The box includes for example booklets about cancer, radio therapy, and chemotherapy; 'KanjierKetting'; movies about a child with cancer; and toys which can help in visualising the information for the children. The products are mainly focussed on children at primary school till 9/10 years old. The box can be borrowed by a school for free if a child has cancer. The goal is to make it easier for teacher to educate the children about cancer, due to this it is hoped the classmate will get a better understanding for the child with cancer. (VOKK, 2016e)

Box with materials to make it easier for teachers to educate children about cancer to create an understanding by classmates.

K.1.3 Materials to support teachers and schools

There are also materials developed to educate or support teachers and schools. Teacher and schools can use these materials to get insight in the illness/cancer, practical tips and tricks, or exchange experiences with other teachers and schools.

Booklets

Several booklets are developed to inform teachers about cancer or chronic illnesses and give tips how to deal with the child. One of these booklets is 'Wat nu? Een leerling met kanker!' written by Tanja van Roosmalen (2012). The booklet starts with an introduction about childhood cancer in which the basics of cancer and its treatment are explained. This is followed by chapters about how to communicate with the parents, other teachers, and pupils; keep contact with the child with cancer; how to deal with the child if he/she goes back to school; and the change of the life after the treatment. (van Roosmalen, 2012) The booklet explains all these aspects and concludes the booklet with practical tips and considerations. These can be easily used by the teachers in class.

Tips and considerations for teachers of a pupil with cancer to inform teachers.

Onderwijsmap

The Onderwijsmap is a folder/booklet, developed by Ziezon, for schools to keep track of a chronically sick child. The folder gives information how to organise the education for a chronically sick child and it gives the teachers the opportunity to keep track of situation of the child. Teacher can for example add information about the physical or emotionally well-being of the child. Due to this all information about the child is kept together to have a complete overview during the whole period of sickness. When the child for example will be taught by another teacher, the folder can be passed on to the new teacher to inform them about the child. The folder can be personalised by adding information about the illness of the child. The folder costs €25,- and €10,- extra for the illness related information. (Onderwijs Databank, 2016)

Information for teachers how to organise the education for a chronically sick child and keep track of the well-being of the child.

Ziezon

Several websites are available for teachers and schools to inform themselves or exchange experiences about teaching a chronically sick child. One of the available websites is Ziezon. Ziezon informs teachers, parents, and children how to deal with education for chronically sick children. Information is given about common diseases and disorders and tips are given. Next to this support materials are explained and people can receive help for requesting these materials. (Ziezon, 2016)

Information about organising the education for a chronically sick child.

K.1.4 Applications about cancer

A lot of applications about cancer are made. These applications give information about cancer for parents or children; give the user the opportunity to keep track of their own health process; or make it possible to connect to peers to exchange experiences.

CancerCare

CancerCare is an application which helps the patient or the parent of the patient to take charge of their treatment. The application facilitates in recording appointments, treatment, mood, side effects, blood

counts, and medical information. This information gives the patient or parent a complete overview of the medical situation of the parent or child in a structured way. By making the application or parts of the application visible for the teacher, important information can be shared in a way that it does not take extra effort from the parents. The advantage for the teacher is all needed information at one place and the information is up to date. Due to this the teacher can better respond on the current needs of the child with cancer. (Rutter, n.d.)

Helps to take charge of the treatment.

Cancer.Net

ASCO has developed the application Cancer.Net. Within this application information can be found about more than 120 types of cancer. For each type of cancer there is information available about the treatment; managing side effects and costs of care; and living with cancer. Next to this, there are interactive tools implemented so the user can keep track of the personal medication, side effects, and questions. One of the types of cancer which is explained is childhood cancer. The application is developed by ASCO due to which it contains trustworthy information based on research. This information could be interesting for teachers as well. Next to this parts of the interactive tools can be shared with the teacher or an interactive tool for teachers can be implemented. Due to this the parents can keep track of the medical situation of the child when he/she is at school. (ASC, 2016)

A source of information and place to keep track of personal situation.

Instapeer

Instapeer is an application to get anonymous contact with peers. The focus is on teenagers and young adults to get in contact with other children with cancers, however it can also be used by caretakers or survivors. By having contact with peers experiences can be exchanged and support can be found. This should help especially the teenagers and young adults feel less lonely. They can feel lonely since classmates or friends cannot imagine how it feels to have cancer. Currently the application is only suitable for teenagers/young adults, caretakers, and survivors, but it could be interesting to make it suitable for teachers as well. Via the application they

can share their experiences, concerns, challenges, or ideas to help each other and find support. (Rutter, n.d.)

Make teenagers and young adults feel less lonely by let them meet with peers.

Re-mission

Re-mission 2: Nanobot's Revenge is an application in which children learn about cancer in a game. The application is developed by young cancer patients in cooperation with the app developer HopeLab. The goal of the developers was to build something that was fun for the children and empowering. The game makes it fun for the children and the children learn about cancer to empower them. In the game the children has to battle against the evil cancer cells inside the human body with a microscopic robot. The child has to beat the cancer cells by shooting chemo blobs on the cancer cells. The game is suitable for children at primary school. The game can be made suitable for computers and multi-player, so classmates can play the game as well to learn about cancer. For them it is a fun way to learn about cancer as well and it creates understanding an empathy for the child with cancer. (Rutter, n.d.)

Teach children about how cancer works while speaking in language kids can understand.

K.2 For autistic children

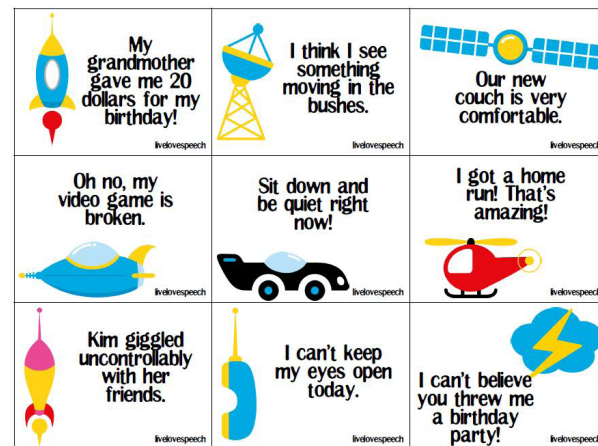
Next to the analysis of existing product for children with cancer at primary school, there is done an analysis of existing product for children with autism. It was chosen to look into these types of product, since many products for children exist to support them to express themselves and to learn about emotion. This analysis served as inspiration for the product/service.

Below a selection of the found products are visualised an explained.



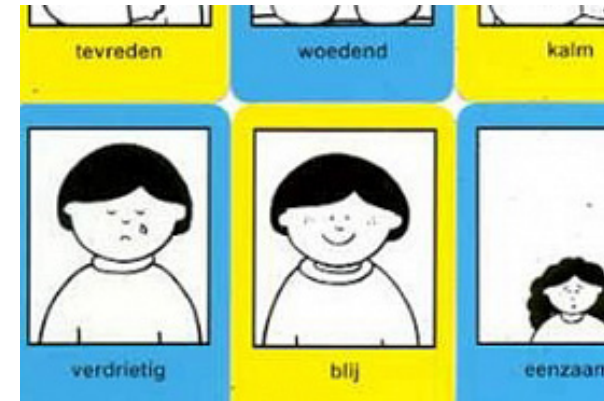
K.2.1 Dice

This dice is used within classes or therapy to talk and teach about emotions.



K.2.2 Responses card

This cards state different situation and is used to teach children about appropriate reactions in different situations.



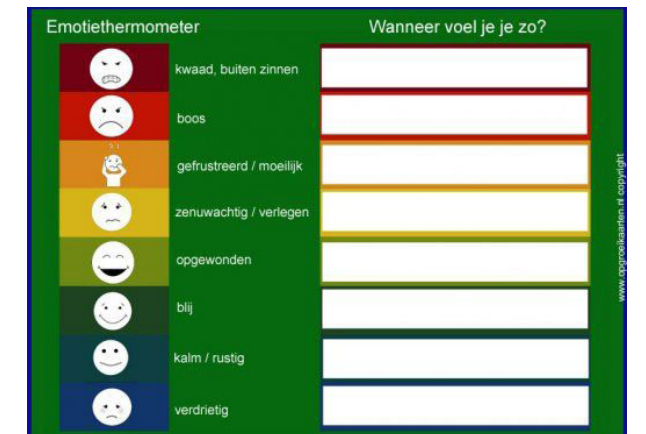
K.2.3 PAD emotion cards

The PAD emotion cards are part of a education program. Blue cards represent unpleasant emotions and the yellow cards presents positive emotion. During the program children learn about different emotions and receive a card of the learn emotion. These cards can be used by the child to place on his table and show how he is feeling.



K.2.4 Emotion wheel

This is a wheel in which the child can show is emotion. Based on the wheel parents of teachers can react on it by leaving the child alone or start a conversation.



K.2.5 Emotion meter

The emotion meter is used to learn about emotions. Above an example of many of the available emotion meters is shown. By describing for each emotion how a child feels, helps the child to recognise the emotion and anticipate on that emotion.

K.2.6 Main insights

There are already products used within class to express emotion. Emoticons and colours are used to express the different emotions. The existing products look cheap and are basic.

L Challenges

Based on the exploratory literature analysis, symposium of the VOKK, meeting: education and cancer, and the interview with the VOKK 70 problems were identified. These problems were clustered into 14 challenges. These challenges were evaluated with the EF consultants from different hospitals. Based on this evaluation the 14 challenges were reformulated and 2 extra challenges were added. This resulted in the 16 challenges as presented in chapter 2.5.

This appendix explains on which information these 16 challenges are based and gives insight into the reason behind the ranking position.

L.1 The child feels afraid or insecure to go back to school

According to Worchel-Prevatt et al. (1998) children could feel insecure or afraid that they are not able to go along with their classmates, especially after a long absence. They are also insecure about the questions classmates could ask (Worchel-Prevatt et al, 1998) (van Grop, 2011) or afraid or unwilling to go back to school since they are scared to be bullied (Deasy-Spinetta, 1993) on being not accepted by their classmates (Prevat, Heffer, Low, 2000) or teacher (Worchel et al., 1998), due to the physical changes. In practise almost none of the children is bullied (EF consultants WKZ) (EF consultant LUMC).

In children are unwilling or afraid to go back to school depends on their age, culture, physical changes, and how the parents and school deal with the situation. The younger the children the more easy it is to go back to school. These children are normally super enthusiastic and are really willing to go back to school. (EF consultants WKZ)

If the children have changed physically the threshold to go back to school can be lowered by preparing the class on these changes for example with Klassecontact. (EF consultants WKZ)

Relevance: Moderate/high
Impact: High

Based on Worchel-Prevatt et al. (1998); van Grop (2011); Deasy-Spinetta (1993); Prevat, Heffer, and Lowe (2000); and Interviews EF consultants.

L.2 The child feels lonely and isolated

Children with cancer can feel lonely, isolated, and not understood (de Haes, van Weezel & Sanderman,

2009) (Vance & Eiser, 2002). Children who got sick tend to withdraw themselves from social activities, which is a natural reaction (EF consultant MC-Sophia). But the sickness makes it also more difficult to participate in activities such as school activities (Fuemmeler, Mullins & Carpentier, 2006). Due to this it becomes more difficult for the child to make new friend (Fuemmeler, Mullins & Carpentier, 2006) and be part of the group. This isolation should be prevented as much as possible (EF consultants WKZ) (Georgiadi & Kourkoutas, 2010). This is a serious challenge which occurs a lot, but there are already lost of solutions which can to prevent this isolation and lonely feeling.

Relevance: Low/moderate
Impact: High

Based on Fuemmeler, Mullins, and Carpentier (2006); Georgiadi, and Kourkoutas (2010); Charlton, Pearson, and Morris-Jones (1986); Vance, and Eiser (2002); de Haes, van Weezel, and Sanderman (2009); and Interviews EF consultants.

L.3 Due to physical and cognitive differences the child is not able to participate in the school activities which results in problems or worries

Due to the symptoms and side effects of the cancer and its treatment, as explained in appendix G, children will experience physical changes (Georgiadi & Kourkoutas, 2010). At school children are in general more active due to which they could experience problems (Charlton, Pearson & Morris-Jones, 1986), such as not being able to participate in physical education.

Children will also experience cognitive changes, such as difficulties with learning (Georgiadi & Kourkoutas, 2010) (Fuemmeler, Mullins & Carpentier, 2006). Due to absence children also have to catch up the work they have missed (Charlton, Pearson & Morris-Jones, 1986). Within class children are likely to not being able to work in the same pace as this classmates (Meeting: Education & Cancer). The cognitive problems have an impact on the social functioning of the child as well (de Haes, van Weezel & Sanderman, 2009).

These changes can make children worry about their cognitive and physical development when they re-enter school (Vance & Eiser, 2002).

In practice is appears that these changes are not as large as expected (EF consultants WKZ). Especially the cognitive changes for children with ALL. The physical changes are larger, however children are aware of these changes and accept that they are not able to participate in all activities like their classmates (EF consultant MC-Sophia). In most situations teachers are able to come up with a different task for the child, so he is part of the activity as well (EF consultants WKZ).

Relevance: Low/moderate
Impact: Low/moderate

Based on Georgiadi and Kourkoutas (2010); Charlton, Pearson, and Morris-Jones (1986); Vance and Eiser (2002); Fuemmeler, Mullins, and Carpentier (2006); de Haes, van Weezel, and Sanderman (2009); Meeting: Education & Cancer; and Interviews EF consultants.

L.4 The child does not feel or is afraid of being not accepted by their classmates

Children, also aged between 8-10 years old, are trying to fit in and form groups (EF consultant LUMC). Sick children are sometimes afraid to not fit in (Tollet, n.d), for example due to misconceptions (Worchel-Prevatt et al. (1998). Nowadays schools focus social development of which accepting ones differences is part (EF consultants WKZ). This is a result of more special needs children at primary schools. It depends on the role of the child before it was diagnosed what

kind of effect it has on his acceptance within the group. There are also situations in which the cancer has an positive effect on the child being accepted (EF consultant MC-Sophia).

Relevance: Low
Impact: Moderate/high

Based on Worchel-Prevatt et al. (1998); Tollet (n.d.); and Interviews EF consultants.

L.5 The child has difficulties in coping with the behaviour difference which he/she experiences in comparison with before the diagnoses or in comparison with classmates

Due to the cancer and its treatment children will experience physical and cognitive changes. Some children have difficulties in accepting these changes (Deasy-Spinetta, 1993). Children a aware of these changes and know what they have to miss (van Gorp, 2011). This makes the children feel different from their peers (de Haes, van Weezel & Sanderman, 2009). Some children also do not dare to do fun thing, if they did not went to school (Erno, 2016).

The EF consultants indicated that this is a mourning process, the children have to say goodbye to the some things they were able to do. Therefore this will be mainly difficult for children after the changes appears or after a setback.

Relevance: Moderate
Impact: Moderate

Based on Deasy-Spinetta (1993); van Gorp (2011); Erno (2016); de Haes, van Weezel, and Sanderman (2009); and Interviews EF consultants.

L.6 There is less empathy of classmates and school at the end of the treatment (and after the treatment)

Some children experiences challenges in the interaction with classmates. The reasons for this are:

- Classmates do not understand a child is not healthy after the treatment. The children often do not look sick, due to which this misunderstanding becomes worse. (Symposium VOKK)
- Children are sometimes bullied by classmates, but more often children in other groups (Lähteenmäki, Huostila, Hinkka & Salmi, 2002).
- The sick child does not want to be seen or treated as special. The child wants to belong to the group (Meeting: Education & Cancer) and does not want pity (de Haes, van Weezel & Sanderman, 2009).
- Some classmates do not know how to react on the child, feel embarrassed to interact with the sick child and his symptoms/side effects (van Gorp, 2011), or are worried about their sick classmate (Tollet, n.d.).
- There are misconceptions about cancer, which influence the interaction between the children, for example classmates who are afraid of being infected with cancer (if the children do think cancer is contagious)

These aspects lead to no or less empathy of classmates and the sick child not feeling understood.

In practise it appears that the classmates helpful and caring when the child gets sick. In the beginning the children are aware of it and have empathy for the child. Over time, this empathy becomes less. The reason for this is not unwillingness, but children forget the child is sick. (EF consultant MC-Sophia) An elements which makes this complicated is that the sick child often wants to be normal and does not want to talk or be reminded on his sickness (EF consultant MC-Sophia).

Relevance: (Extremely) High
Impact: High

Based on Lähteenmäki, Huostila, Hinkka, and Salmi (2002); de Haes, van Weezel; and Sanderman

(2009); Meeting: Education & Cancer; van Gorp (2011); Symposium VOKK; Educatieve Voorziening UMC Utrecht (2007); and Interviews EF consultants.

L.7 The child is not receiving education continuously

The EF consultants of the WKZ indicated that the largest barrier of their work is creating ongoing education for the sick child. They mentioned that the communication could be too slow, due to which other education givers are not able to educate the child with the appropriate education materials, or there is not enough time to work individually with the child. A continuous education offer is important for the cognitive development of the child.

Relevance: Moderate
Impact: Low

Based on Interviews EF consultants.

L.8 There are large differences in the capabilities of teachers and schools, due to which large differences between children arise

There are large difference between how schools take care for a child. Some schools and teachers are very active in arranging things and looking for opportunities. Other school do not have these possibilities due to lack of knowledge, capacity, time, or restricting rule. Due to this large differences between the schools exist. This could result in children who are doing well, are doing better and better, while children how are doing not well are getting worse and worse. This is also depending on the capacity of the parents.

Relevance: Moderate/high
Impact: Moderate

Based on Interviews EF consultants.

L.9 Teachers have difficulties to cope with their own feelings and emotions

Most teacher only experience this situation once, so for many teachers (and schools) they have a new experience and do not know how to react (EF consultant LUMC). Most teacher are naturally able to coop with the situation, but some teachers have no idea what to do (EF consultants WKZ) (EF consultant MC-Sophia). Some teachers start to become emotional, while others start to take action (EF consultants WKZ). It depends on several factors, such as the class they are teaching, the support from school, or the capacities from school (EF consultants WKZ).

For some teachers the emotional impact (Prevat, Heffer & Lowe, 2000) the impact is too large, due to which they get a burn out (EF consultant MC-Sophia). This has a large impact on the child and of course must be prevented. It is also possible that teachers project their own way of coping with or expressing emotions on the child (Meeting: Education & Cancer), this has a negative effect on the child as well.

Around 50% of the teachers experience this challenge (EF consultants WKZ), which makes it less relevant for the project.

Relevance: Low
Impact: Low

Based on Prevat, Heffer, and Lowe (2000); Meeting: Education & Cancer; and Interviews EF consultants.

L.10 Teachers have difficulties with discussing the subject cancer (or related subjects) in class

Most teacher have difficulties with discussing the subject cancer within their class (Meeting: Education & Cancer). Nowadays people know what cancer is, due to this it becomes easier to understand and discuss it. There are also less difficulties with shame than for example with a chronically bowel disease.

Furthermore there is the 'Leskoffer' which can help teachers to discuss the topic cancer (Interview VOKK).

There are cultural differences. What can be seen is for example that it is more difficult to discuss with people with a non-Western background (Interview VOKK).

Discussing it with younger children is also more difficult, since they do not understand it.

Most teacher discuss it even though it could be difficult (EF consultants WKZ).

Relevance: Low
Impact: Low

Based on Interview VOKK; Meeting: Education and Cancer; and Interviews EF consultants.

L.11 Teachers miss information and guidance, which results in insecurities and a lack of clarity

Teachers feel insecure and indicate a lack of clarity. Teachers indicated that there is not enough information about the psychological and behavioural problems which children experience (Vance & Eiser, 2002), they need more information about the needs of a child and guidance during re-entrance (Moore, Kaffenberger, Goldberg, Oh & Hudspet, 2009) (Charlton, Pearson & Morris-Jones, 1986), and have the feeling they do not have enough information about the sickness and the situation of the child (Prevat, Heffer & Lowe, 2000). Next to this, according to the Meeting: Education & Cancer teacher receive contradicting information of the parent and child and are afraid to take care of the child in a wrong way. This results in insecurity and a lack of confidence (Charlton, Pearson & Morris-Jones, 1986).

The EF consultants mentioned that teachers indeed could feel insecure in the beginning, since it is a new situation on which they are not prepared during their education (EF consultant LUMC). However they mentioned that they are available for all questions can guide the teachers during the process of taking care of a sick child at school. They only doubt if all teachers are aware of the existence of the EF and their tasks.

Relevance: Low/moderate

Impact: Low

Based on Charlton, Pearson, and Morris-Jones (1986); Meeting: Education & Cancer; Prevat, Heffer, and Lowe (2000); Vance and Eiser (2002); Moore, Kaffenberger, Goldberg, Oh, and Hudspeth (2009); and Interviews EF consultants.

L.12 The communication is seen as difficult and a barrier by teachers and parents

According to Moore, Kaffenberger, Goldberg, Oh, and Hudspeth (2009) parents have the feeling medical and school services are not consistent and are experienced as a barrier instead of a bridge and parents would like to have 1 coordinator to whom they can communicate.

Teachers have the feeling they are unprepared and do not have enough information to fulfil the educational and inter-personal needs of the child (Prevat, Heffer & Lowe, 2000). Furthermore, they have difficulties in communicating with the family and medical professionals (Prevat, Heffer & Lowe, 2000) and it is unclear who is responsible for what (Moore, Kaffenberger, Goldberg, Oh & Hudspeth, 2009).

The last difficulty within the communication is the fact that medical professionals are not allowed to talk to the hospital without the permission of the parents due to the professional secrecy. In practise this means that the communication between school and medical professional is done via the parents. (Meeting: Education & Cancer) This is sometimes challenging for the school, since the parents decide which information the school gets (EF consultants WKZ).

According to the interviews with the VOKK and EF consultants parents do not see the communication with school as difficult. The only difficulty they experienced with communication was the communication with other parents. These parents do not know how to approach the parents of the sick child.

Relevance: Moderate
Impact: Moderate

Based on Moore, Kaffenberger, Goldberg, Oh, and Hudspeth (2009); Prevat, Heffer, and Lowe (2000); Meeting: Education & Cancer; and Interviews EF consultants.

L.13 The expectations of the surrounding (school, home, and hospital) about the child do not match with each other and are not realistic, they over- or underestimate the child

Cancer has a large impact on a child and is an uncommon situation. Therefore it is difficult for people to imagine the impact (EF consultant LUMC). Due to this teachers, but also other people in the surrounding of the child do not know how to interact with the child (Prevat, Heffer & Lowe, 2000) (EF consultants WKZ).

In general people are overanxious, due to which they tend to underestimate the child (Charlton, Pearson & Morris-Jones, 1986) or make insufficient demands out of pity (de Haes, van Weezel & Sanderman, 2009) also on behaviour level (EF consultants WKZ). Parents can receive information and support from the 'pedagogische medewerker' from the hospitals, teachers have only the support from the EF or EAO consultant (EF consultants WKZ).

Finally, there is not enough information about the psychological and behavioural problems children could experience (Vance & Eisen, 2002), next to this teachers are more concerned about the academic results and development and safety of the child. (Vance & Eisen, 2002). Children also have the feeling they are underestimated, they sometimes are bored as school since it is too easy (Erno, 2016). This is a serious challenge for which no real solutions are.

Relevance: High
Impact: High

Based on Prevat, Heffer, and Lowe (2000); Charlton, Pearson, and Morris-Jones (1986); de Haes, van Weezel, and Sanderman (2009); Vance, and Eiser (2002); and Interviews EF consultants.

L.14 Children, teachers, and classmates have difficulties in expressing themselves

Lähteenmäki, Huostila, Hinkka, and Salmi (2002) stated that not all children are willing or able to talk about their own sickness. Charlton, Pearson, and Morris-Jones (1986) indicated that children have sometimes difficulties in reacting on their own sickness.

The EF consultants from the WKZ indicated that it could have positive effect on the child to talk about it with his teacher and or classmates. They would prefer a tool to start the conversation with a low threshold and without putting the child in the centre of attention. The EF consultant of the MC-Sophia indicated that in most cases this is not an issue and children do not always feel the need to talk about it.

Relevance: Moderate
Impact: High

Based on Lähteenmäki, Huostila, Hinkka, and Salmi (2002); Charlton, Pearson, and Morris-Jones (1986); and Interviews EF consultants.

L.15 The parents are afraid to let their child go back to school

According to Georgiadi and Kourkoutas (2010) parents are sometimes afraid or unwilling to let their child re-enter school. They are overanxious and afraid their child will get an infection at school (Georgiadi & Kourkoutas, 2010) or will be bullied (Vance & Eiser, 2002). Parents also could feel insecure, for example when there is a lack of trust (Charlton, Pearson & Morris-Jones, 1986). This could have a negative influence on the re-entrance of the child, especially if the parents are too close involved in the process (Charlton, Pearson & Morris-Jones, 1986).

According to the EF consultants parents are never unwilling to let their child re-enters school. Sometimes they are afraid, especially after a setback or if the child is still in aplasia (EF consultants WKZ). At home parents know what happens, they are in control and have a protective feeling (EF consultant MC-Sophia). When the child is at school they have to give this control to the school and trust them. The

main reason to for parents to be afraid is the change of getting an infection at school. Parents of children who go to high school are sometimes afraid their child will be bullied (EF consultant LUMC), however in practise this almost never happens.

Relevance: High
Impact: High

Based on Georgiadi and Kourkoutas (2010); Charlton, Pearson, and Morris-Jones (1986); Vance and Eiser (2002); and Interviews EF consultants.

L.16 School does not take good enough care for siblings

The complete family is affected by the cancer. Most school tend to the effects on siblings. These effects are not taken into account and all care and attention goes to their sick sibling (Meeting: Education & Cancer)

Relevance: High
Impact: Moderate

Based on Meeting: Education & Cancer.

M Design Opportunities

This appendix elaborates on reasons for choosing design opportunity 2) Understanding what to expect as presented in chapter 2.7.

M.1 Empathy of classmates

Below the ranking is explained based on relevance and impact.

M.1.1 Relevance

How often are the challenge(s) addressed experienced?

In general less empathy was experienced at the end of the treatment, when the cancer and its treatment were less visible. It was mainly experienced by children at high school or by children at primary school after school time.

How many solutions are available?

Within class, teachers try to involve the child for example by giving children special tasks. After school time there are no solutions.

How large is the need to solve the addressed challenge(s)?

The need is large.

M.1.2 Impact

What is the magnitude of the effect?

The impact can be large and make the sick child feel lonely.

How many groups will benefit?

The sick children.

M.2 Understanding what to expect

Below the ranking is explained based on relevance and impact.

M.2.1 Relevance

How often are the challenge(s) addressed experienced?

By most teachers and sick children.

How many solutions are available?

There are no solutions available.

How large is the need to solve the addressed challenge(s)?

Large for the sick children, parents, and teachers.

M.2.2 Impact

What is the magnitude of the effect?

The magnitude is large, it effects the development negatively and can results in a negative self-image and less self-confidence.

How many groups will benefit?

The sick children and the teachers. The sick children will be able to develop more effective and teachers will feel more confident.

M.3 Fear to go to school (of the parents and the child)

Below the ranking is explained based on relevance and impact.

M.3.1 Relevance

How often are the challenge(s) addressed experienced?

Most children are enthusiastic to go back to school and do not feel afraid. Children how do sometimes experience fear are children who changed physically and mostly children at high school.

Parents do often feel afraid, since they have to let go the control and trusts school they will care for their child.

The challenge is experienced when the child re-enters school after the diagnosis or a relapse.

How many solutions are available?

There are no solutions available yet.

How large is the need to solve the addressed challenge(s)?

The experience of the child is minimal effected, therefore there is only a small need to solve it. Furthermore it was advised to let a health professional take the fear away, since that would be must more effective.

M.3.2 Impact

What is the magnitude of the effect?

In most situations the fear does not stop children to go to school, therefore the impact is small on the child and parents will get used to it over time.

How many groups will benefit?

Mainly the parents are effect, sometimes the children.

M.4 Decision design opportunity

I have decided to continue with the design opportunity 'Support teachers to know what to expect from a child with cancer'. The reason for this choice was that all interviewed participants from the different perspectives recognised the challenge addressed in the design opportunity for children in group 5/6 and it is supported by the literature. While the design opportunity 'empathy from classmates' was not recognised by the mother at school and the psychologists mentioned that mainly at high school it was seen that classmates did not had empathy for the child with cancer. The design opportunity 'fear to go to school' was not often seen, since children are generally very happy to go back to school and the psychologists mentioned that is would be more convenient to let doctors tackle the fear of the parents than the school.

N Mood

Chapter 2.8 presented a set of mood states and the influence of cancer and its treatment on mood. This appendix elaborates on these two aspects.

N.1 Set of mood states

As mentioned in chapter 2.8 researchers did not make a general selection of basic or principal mood states. Some researchers even question if something as basic of principle mood states even exist (Ortony & Turner, 1990). Therefore an own mood set is created based on several mood sets presented by researchers and own made criteria.

N.1.1 Overview

An overview is made of mood sets presented by different researchers presented in figure 33.

Desmet, Vastenburg, van Bel & Herrera (2012)	1) Exited-Lively, 2) Cheerful-Happy, 3) Tense-Nervous, 4) Irritated-Annoyed, 5) Sad-Gloomy, 6) Bored-Weary, 7) Calm-Serene, 8) Relaxed-Carefree	
DeLancy (2006)	1) Fear, 2) Anger, 3) Sadness, 4) Joy, 5) Disgust	
Al-Shawaf, Conroy-Beam, Asao & Buss (2015)	1) Disgust, 2) Fear, 3) Anger, 4) Surprise, 5) Sadness, 6) Happiness, 7) Contempt	
Ekman (1992)	1) Happiness, 2) Surprise, 3) Fear, 4) Sadness, 5) Anger, 6) disgust with contempt	
Ortony & Turner (1990)	1) Anger, 2) Aversion, 3) Courage, 4) Dejection, 5) Desire, 6) Despair, 7) Fear, 8) Hate, 9) Hope, 10) Love, 11) Sadness	Arnold (1960)
	1) Anger, 2) Disgust, 3) Fear, 4) Joy, 5) Sadness, 6) Surprise	Ekman, Friesen, & Ellsworth (1982)
	1) Desire, 2) Happiness, 3) Interest, 4) Surprise, 5) Wonder, 6) Sorrow	Frijda (Personal communication September 8, 1986)
	1) Rage and terror, 2) Anxiety, 3) Joy	Gray (1982)
	1) Anger, 2) Contempt, 3) Disgust, 4) Distress, 5) Fear, 6) Guilt, 7) Interest, 8) Joy, 9) Shame, 10) Surprise	Izard (1971)
	1) Fear, 2) Grief, 3) Love, 4) Rage	James (1884)
	1) Anger, 2) Disgust, 3) Elation, 4) Fear, 5) Subjection, 6) Tender-emotion, 7) Wonder	McDougall (1926)
	1) Pain, 2) Pleasure	Mowrer (1960)
	1) Anger, 2) Disgust, 3) Anxiety, 4) Happiness, 5) Sadness	Oatley & Johnson-Laird (1987)
	1) Expectancy, 2) Fear, 3) Rage, 4) Panic	Panksepp (1982)
1) Acceptance, 2) Anger, 3) Anticipation, 4) Disgust, 5) Joy, 6) Fear, 7) Sadness, 8) Surprise	Plutchik (1980)	

Figure 33: Overview sets of mood state identified by different researchers

N.1.2 Criteria

The following criteria are formulated for the set of mood states:

- Children must understand the mood states and be able to make a distinction between the mood states: Children aged between 8-10 year old are not able to recognise all different moods
- The amount of pleasant and unpleasant mood states must be equal: to prevent steering the children into one direction
- Minimal 4 and maximal 8 mood states can be included: a limited choice supports the children to choose quickly and intuitively and stimulates them to change it during the day
- Useful for the teacher to know: The mood must support the teacher in offering the child what he needs
- Experienced by children with cancer: Children with cancer experience different moods than 'regular' children
- Complete range of moods: The child must always be able to choose one of the mood states to express himself

Based on these criteria and the presented sets of mood states, it was chosen to include 6 diverse and broad to interpreted mood states as presented in chapter 2.8.

N.2 Influence of medication on mood

Corticosteroid medications contain hormones which are used to reduce the side effects of the cancer and its treatment (Tidy, 2015) (Apotheek.nl, 2016). These hormones influence the mood, behaviour regulation, and memory of the child (Mrakotsky et al, 2011). During the induction phase the child receives daily corticosteroids, during the consolidation and maintenance phase the doses is reduced (Reinier de Graaf, 2015).

Within the blog of Marielle (2011), she describes the effects of Dexamethasone on her son. During the maintenance phase, her son had to take Dexamethasone for a week every month. During the weeks her son took Dexamethasone, due to which her son changed completely. He was feeling depressed and apathetic and he reacted extremely explosive and unexpected. During most weeks he was not able to go to school or participate in other activities. Due to this, it has a large impact on their family. (Marielle, 2011)

O Design Guidelines

Chapter 2.11 presented guideline when design for children with cancer on primary school. Below these guidelines are amplified.

O.1 Design the product/service with taking the different and changing needs of different users into account.

The effect cancer has on the life of a child and his family is very different for each person and each situation. People cope differently with cancer and different situations will evoke different needs. Therefore it is important that the product/service is able to address the different and changing needs of the different children in different situations.

O.2 Design to keep or create normalcy.

Cancer disrupts life and therefore the child and his family need to create a new normalcy. In their new normalcy only a few elements will stay similar to their old normal, therefore the product/service should not disrupt these few elements and help in creating a new normalcy. School is for the children one of these elements which feels as the old normal and where they do not feel sick. This feeling should not be disrupted by the design, at school the child just wants to feel normal.

O.3 Stimulate coping strategies.

Using coping strategies is important during a life disruptive event as cancer. Therefore a product/service should stimulate the use of problem- and emotional focussed strategies.

O.4 Provide a sense of control.

When a child gets sick, he and his family lose control. Giving control back helps the family to cope with the situation.

O.5 Design benefits.

Cancer costs a lot of energy for the child and his family. Therefore the product/service should be easy to understand and use with clear benefits. The child and family do not have time and do not want to spend much time on finding out how a product works. By making the product/service simple to use with clear benefits it is more likely the product/service will be and keeps being used.

O.6 Take all involved stakeholders into account.

Not only the child with cancer will be affected by the cancer, but also his family, teacher, and classmates. Therefore a product/service should always take the family (parents and siblings), and teacher, and classmates into account. Depending on the design a focus can be chosen, however none of the stakeholders can be neglected.

O.7 Stimulate regular development.

Children with cancer are not able to develop regularly. At some aspects children will fall behind the regular development, these aspects should be stimulated. However on other aspects the child will be more mature than a regular child from the same age. These differences should be taken into account in the design as well.

O.8 Take common symptoms and side effects into account.

Cancer and its treatment causes a lot of physical and emotional symptoms, side effects, and late effects. These differ per child, however there are several which are experienced very often. For example fatigue, problems with the fine motor skills (caused by the chemo drug Vincristine), and mood swings (caused by drugs as Prednisone/Dexamethasone). Next to the differences per child, the symptoms and effects differ over time, which should be taken into account by a designer as well.

O.9 Design from the perspective of the child.

Adults experience cancer different than children. Children are for example much more flexible and express emotions differently. To make a product/service suitable for a child, a designer should look from the perspective of the child.

O.10 Design a ready to use and time efficient product/service.

Teachers have a lot of organisational tasks besides their educational tasks. Combined with the increase of the amount of children who need extra care, teachers do not have much time. Therefore a product/service should be time efficient and ready to use, so easy to understand requires limited preparation from the teacher.

P Requirements & Wishes

The most important requirements and wishes are presented in chapter 3 which are indicated by the bold font type. This appendix gives an overview of all formulated requirements and wishes.

P.1 Requirements

The following requirements are formulated:

P.1.1 Functions

- **The product/service should support the child in expressing his mood throughout the day.**
- **The product/service should support the child in expressing or measuring his energy level throughout the day.**
- **The product/service should facilitate the teacher in understanding the moods and energy level when walking through the classroom (so easily and quickly).**
- **The product/service should be able to adapt to or address the different needs of children.**
- **The product/service should support the teacher and child to communicate with each other about mood, energy level, and the individual planning.**
- The product/service should support the teacher in creating a individual planning for the child.
- **The product/service should involve the child in creating the individual planning for him (to give the child self-control).**
- The product/service should stimulate the teacher and child to evaluate the created individual planning.
- The product/service should be able to adapt to/ address the different needs of teachers.
- The classmates should benefit from the element of the product/service they use.
- The product/service should be adaptable during the day.
- The product/service should stimulate the social & personality of the child with cancer.
- The product/service should stimulate the child to use emotional-focussed coping strategies.

P.1.2 Interaction

- The product/service has to be used by the child with cancer only during school hours.
- The product/service should be directly usable and accessible for teachers.

- The child with cancer should be able to use the product/service in a short time (maximal 5 minutes during an activity).
- The teacher should be able to use the product/service in a short time during school hours (maximal 5 minutes during an activity).
- The classmates should be able to use the product/service in a short time (maximal 5 minutes during an activity)
- The product/service should be easy to use by people with minimal experience with technology.
- The product/service should give the child feedback when interacting with the product/service.
- **The product/service should be easy to use by children dealing with symptoms of cancer or side effects of the treatment, like problems with fine motor skill, fatigue or mood swings.**
- The product/service should be able to be used by multiple teachers of a child.
- The product/service may not necessarily be used within the first 10 minutes of the school day by the teacher.

P.1.3 Experience

- **The product/service may not disturb the regular school experience of the child with cancer.**
- The product/service may not put the sick child or its sickness in the centre of attention.
- The product/service empowers the child's self-image and self-confidence.
- The product/service should give the teacher a confident feeling.
- The product/service should give the teacher a informed feeling.
- The product/service should give the child the feeling of belonging.
- The product/service should give the child a secure feeling.
- The product/service should give the child the feeling he is understood.
- **The product/service should give the child the feeling of control.**
- The product/service should feel personal for the child.

- The product/service should make the benefits of use clear for both the child with cancer as for the teachers.
- The product/service should fit in the products/services used nowadays in class.

P.1.4 Appearance

- The product/service should look inviting.
- **The product/service should fit the school context.**
- The product/service should fit the world of a child without becoming childish.
- The product/service should look trustworthy.
- The product/service should look safe.

P.1.5 Detailing

- The materials used for the product are not toxic.
- The materials used for the product are not flammable.
- The materials used for the product have a life span for at least 3 years.
- The product must be easy to clean.
- The product may not have sharp edges or corners.
- During failure the product may not harm the user.

P.2 Wishes

The following wishes are formulated:

P.2.1 Functions

- The product/service includes the parents.
- The product/service stimulates the child with cancer to share his mood and energy level with his classmates.
- **The product/service is self-explanatory.**
- The product/service is able to monitor the mood and energy level of the child over time.
- The product/service can be used by children with other special needs, for example siblings or children with autism.
- The product/service can be used in another context, for example at home or in the hospital.
- The product/service should support children to express themselves in a way which suits them, for example by drawing, talking, or acting out.
- The product/service can be personalised.

- **The product/service should give the child the ability to only communicate his moods and energy level with his teacher and not his classmates.**
- **The product/service stimulates the child to create a new normalcy.**
- The product/service should stimulate the child to use problem- and emotional-focussed coping strategies.

P.2.2 Interaction

- The product/service should be fun to use for the child with cancer, also over a longer period of time.
- **The product/service should be used in the shortest time as possible by the teacher.**
- **The product/service should be used in the shortest time as possible by the child with cancer.**
- **The product/service should be used in the shortest time as possible by the classmates.**
- **The product/service is only used during individual or group work by the child.**
- **The product/service is only used during individual or group work by the teacher.**

P.2.3 Experience

- The product/service should empower the self-confidence of the child with cancer.
- The product/service should take the trends within education into account.
- The product/service should take the trends within the treatment of cancer into account.

Q Morphological Chart

A morphological chart (figure 34) was made based on the results of the How to...? brainstorm. The morphological chart was used to create 7 divers design directions and focuses on the interaction with the product(s) and the interaction between the child and the teacher.

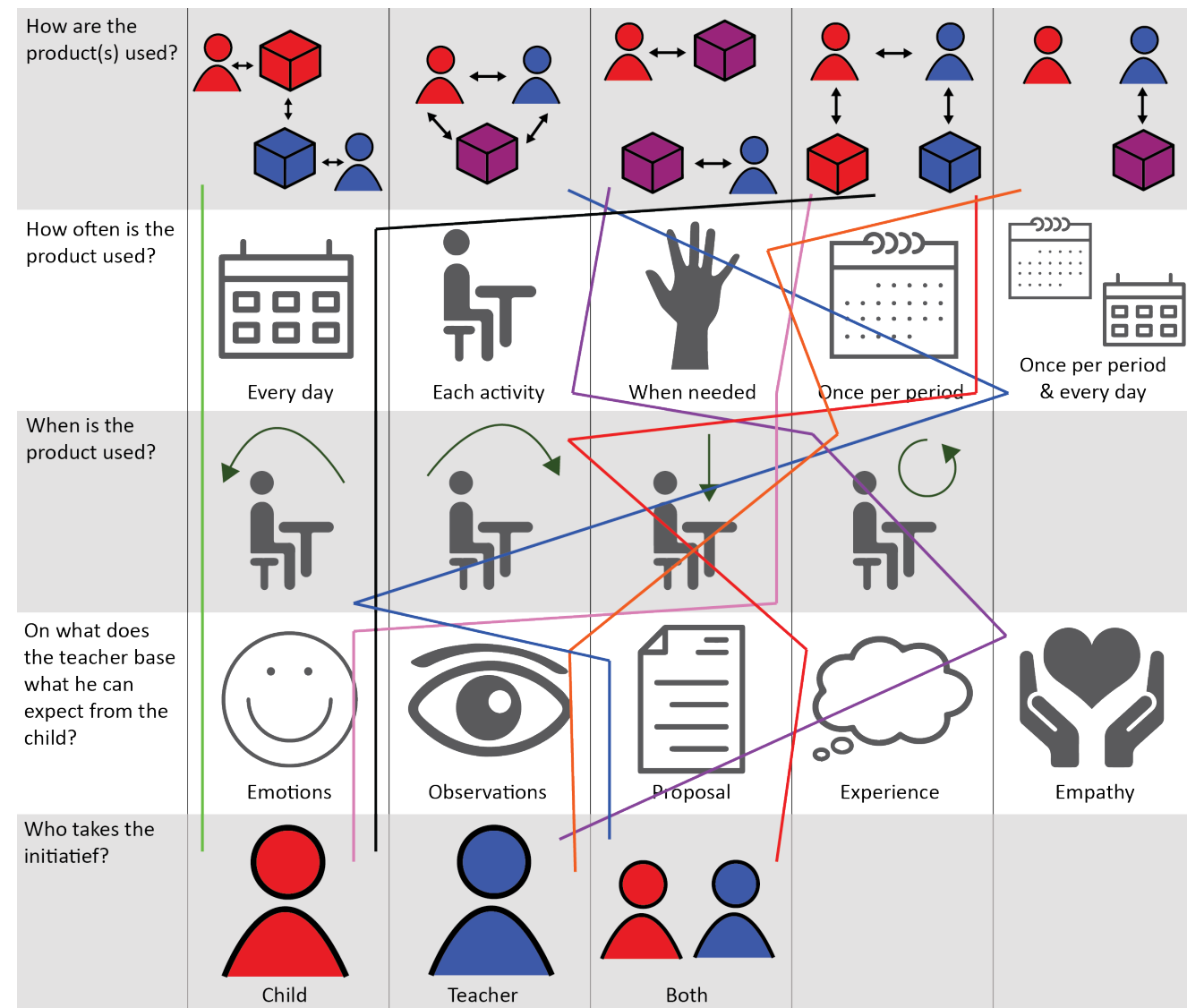


Figure 34: Morphological chart based on the results of the How to...? brainstorm

R Design Directions

Based on the morphological chart 7 design directions were created. This appendix shows the design directions as how they were presented in during the evaluation as presented in appendix B.10 (figure 35 till 41).

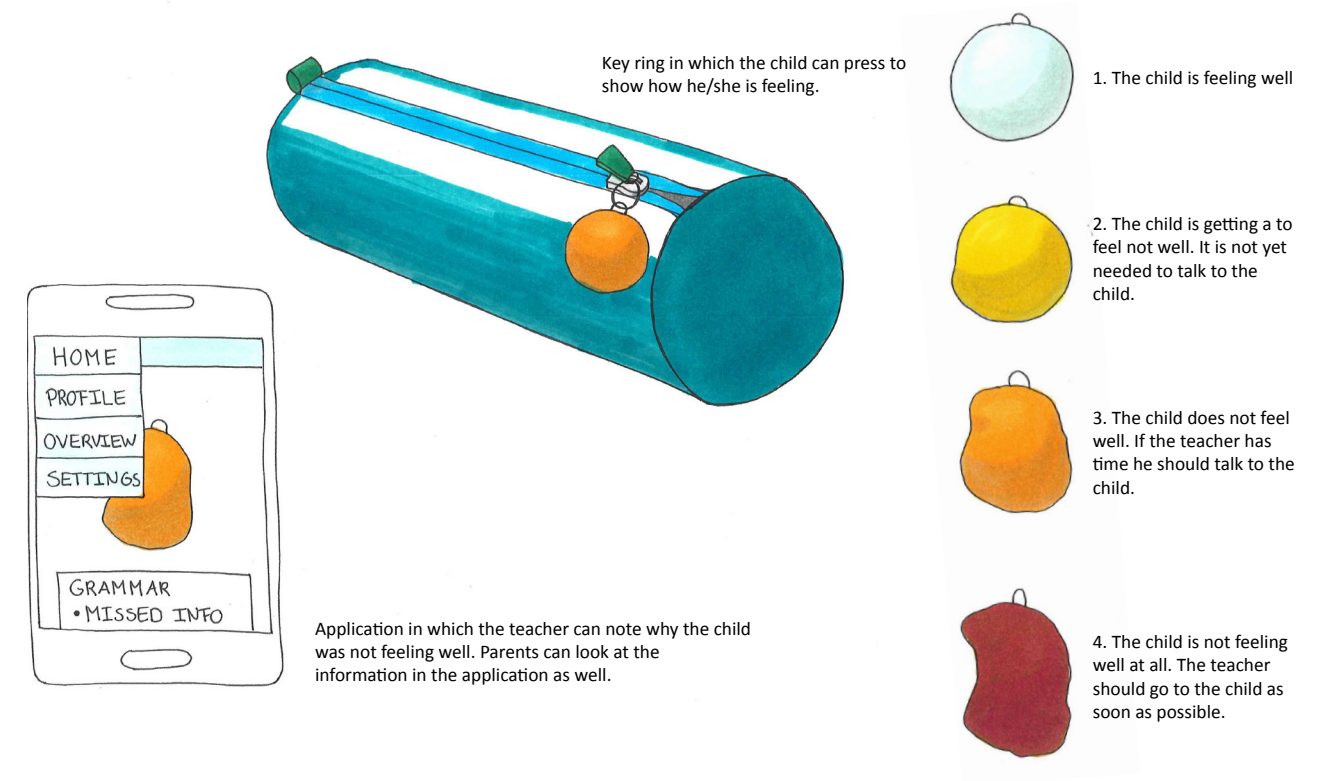


Figure 35: Direction 1

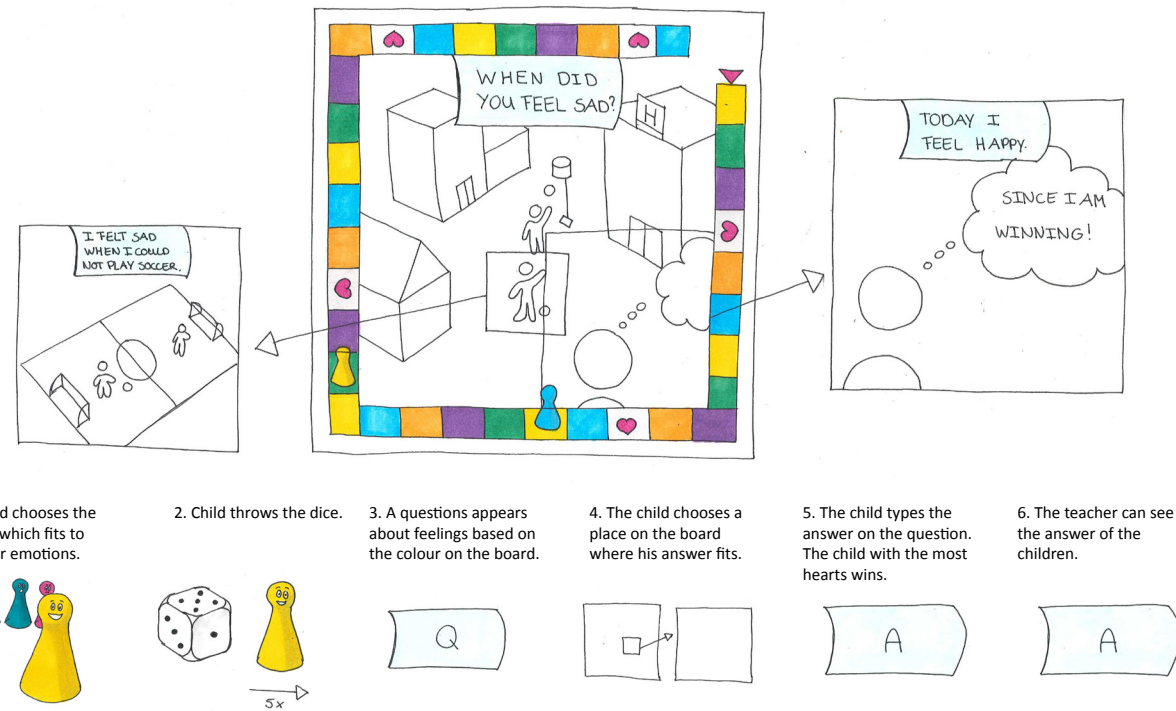


Figure 36: Direction 2

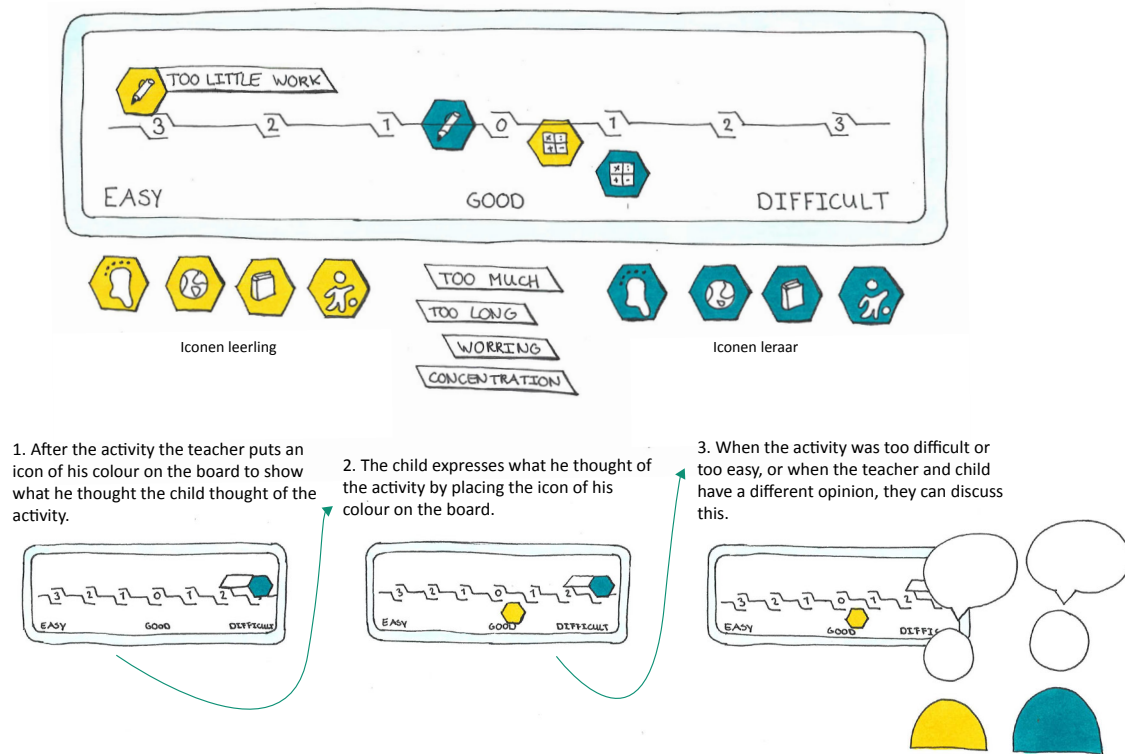


Figure 37: Direction 3

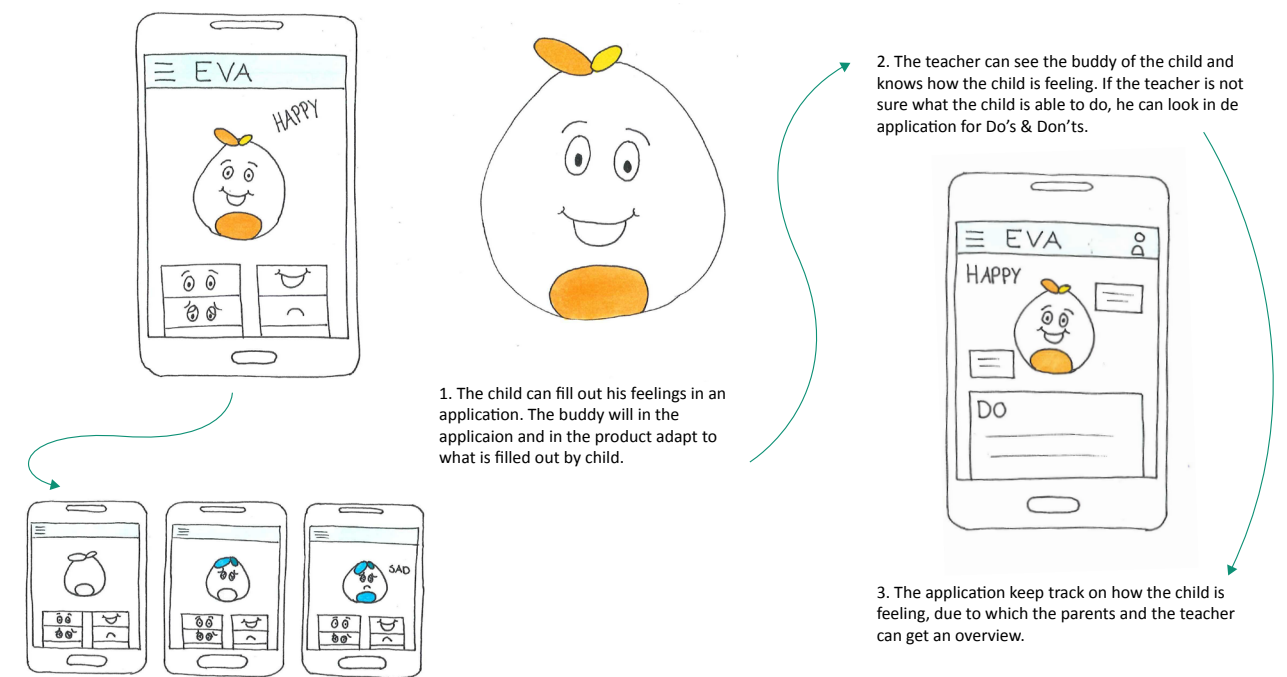


Figure 38: Direction 4

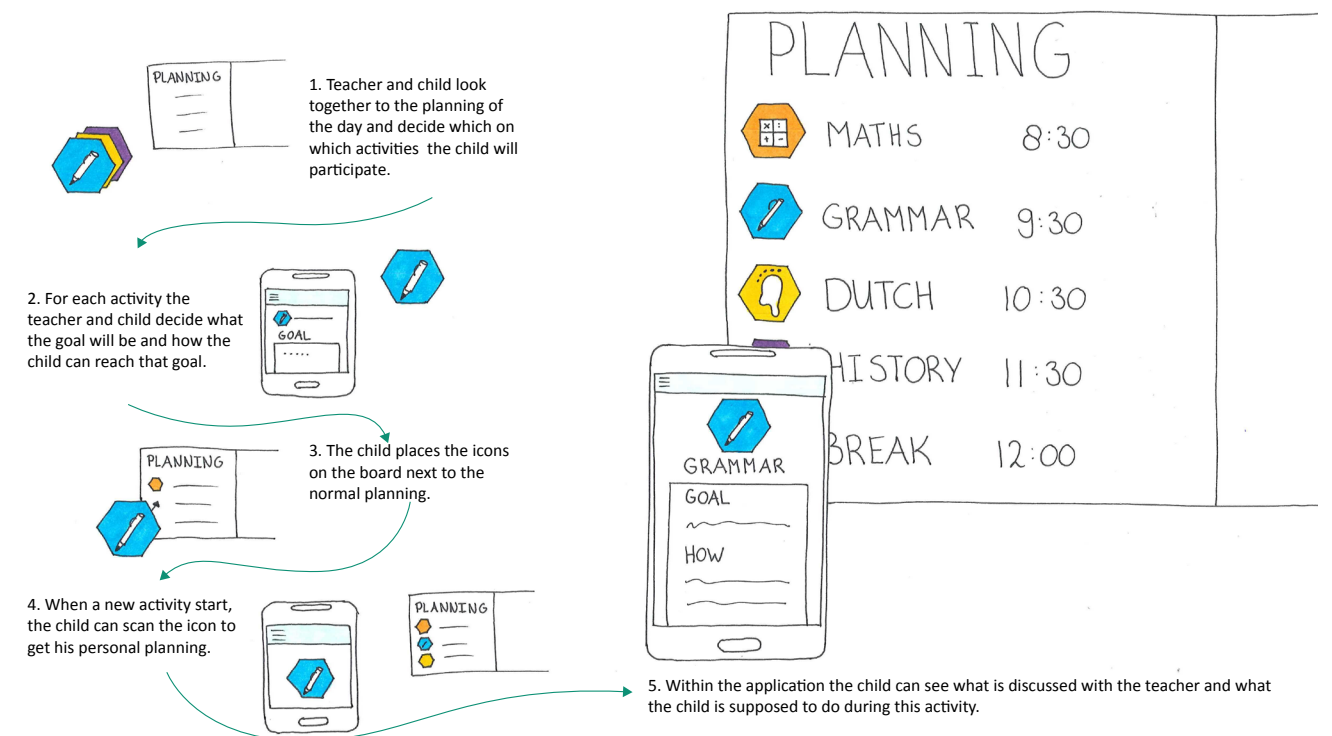


Figure 39: Direction 5

5 Concept Directions

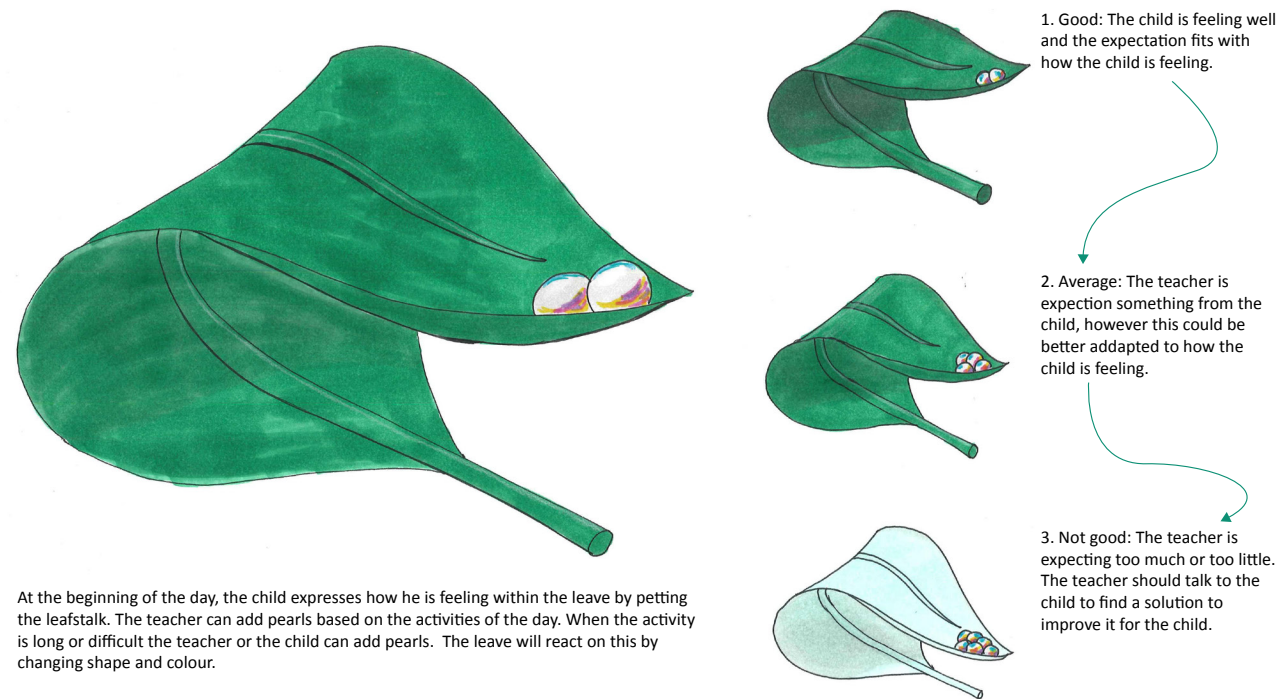


Figure 40: Direction 6

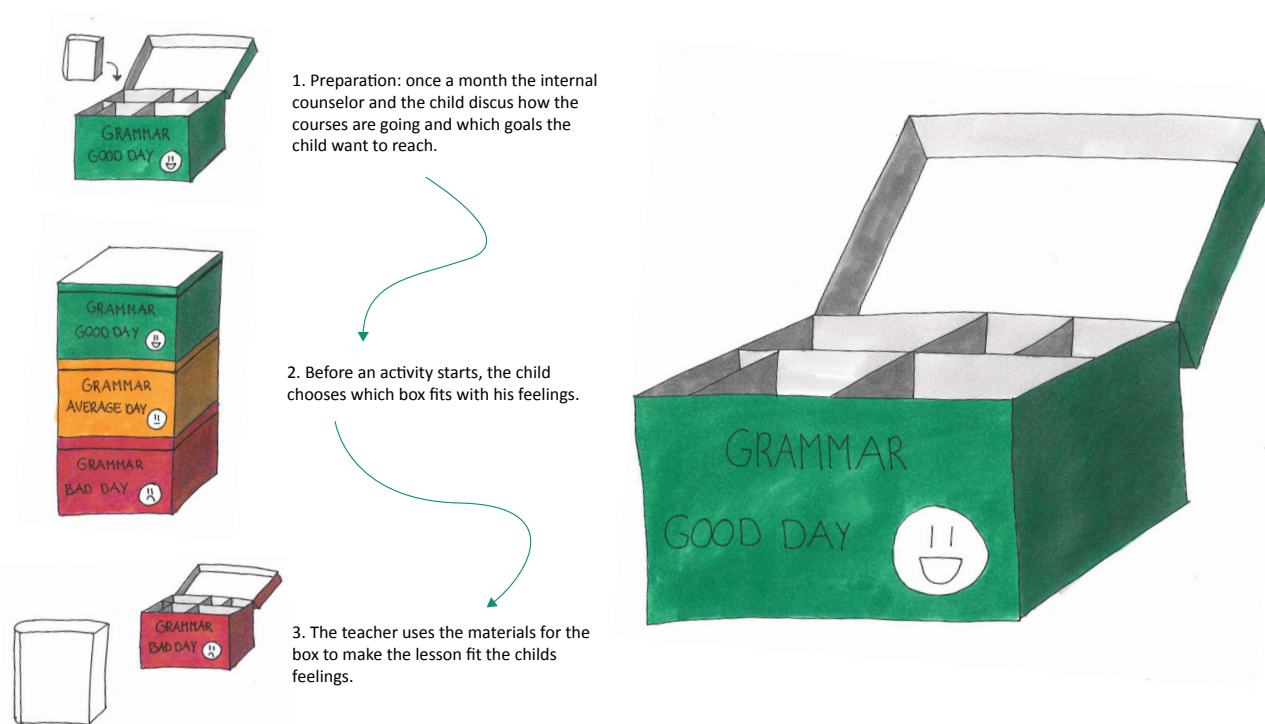
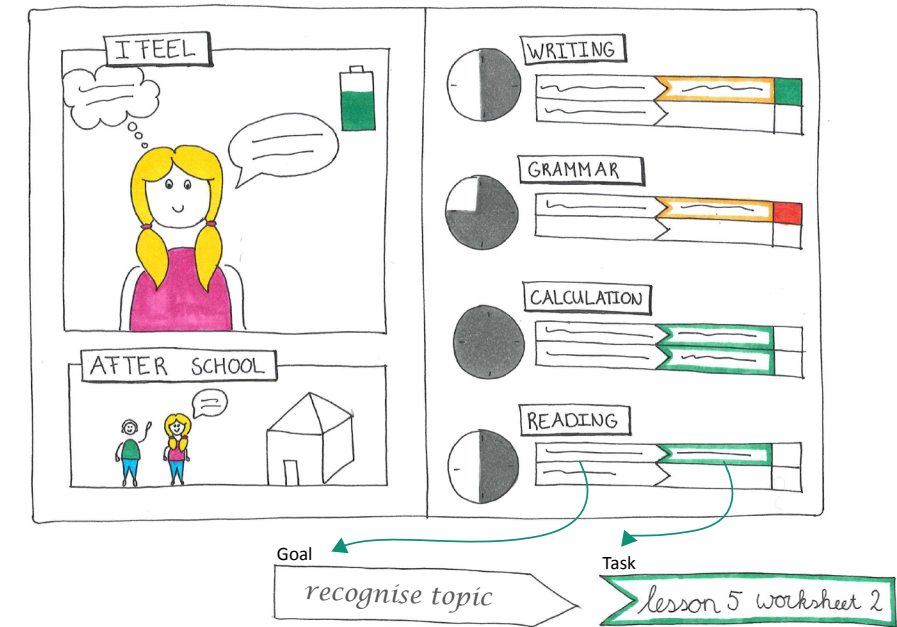


Figure 41: Direction 7

Based on the key elements for the product/service and the results of the brainstorm session two concept directions were created. This appendix shows these concept directions and the comparison between them.

5.1 Concept direction 1

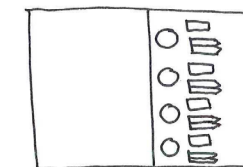
The purpose of the first concept direction was to make a design without technology and use an element of what children like, comics. Figure 2 explains how the concept direction is used.



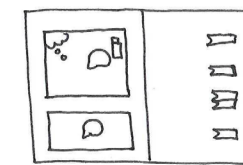
Scenario of use



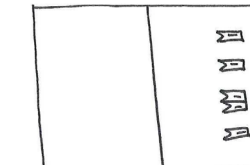
1. During a one-time group activity, all children create a character of themselves.



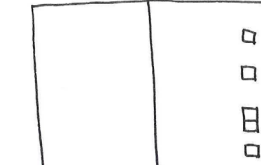
2. The day before the child comes to school, the teacher fills out the planning of the day by adding courses, goals, and times.



3. When the child arrives at school, he/she draws how he/she is feeling and what he/she is going to do after school. Next to this, the child indicates for each goal the level of difficulty.



4. Teacher and child discuss what the child has filled out and the teacher adds which tasks the child should do. This is based on the chosen level of difficulty.



5. At the end of the course the child and teacher can reflect on tasks and the choices of the child.

Figure 42: Concept direction 1

5.1.1 Implementation key elements

The key elements are as followed implemented in the concept direction:

Emotions & Energy level

The child is asked to fill out one page of the booklet at the beginning of each day. The left side of the page is about how the child is feeling. The child can create a visual, in a comics-like way, about how he is feeling. The energy level can be visualised in a battery. The reason for his feelings and energy level can be explained in the thinking and speech clouds. Next to this the child can add what he is going to do after school. This helps the teacher to get a better understanding of the child. If the child for example needs to go to the hospital it could explain the fear a child could feel. If a child is going to a party after school, the teacher can help the child to not use all his energy at school.

Planning & Evaluation

On the right side of the page, there can be made an individual planning. The day before the child comes to school, the teacher writes the activities and its duration down. At the beginning of the day the child

can choose which activities he wants to participate and on which level difficulty. The teacher and child can together decide which tasks the child is going to do based on the information filled out by the child. The tasks can be evaluated by colours: red, orange, green.

Self-control

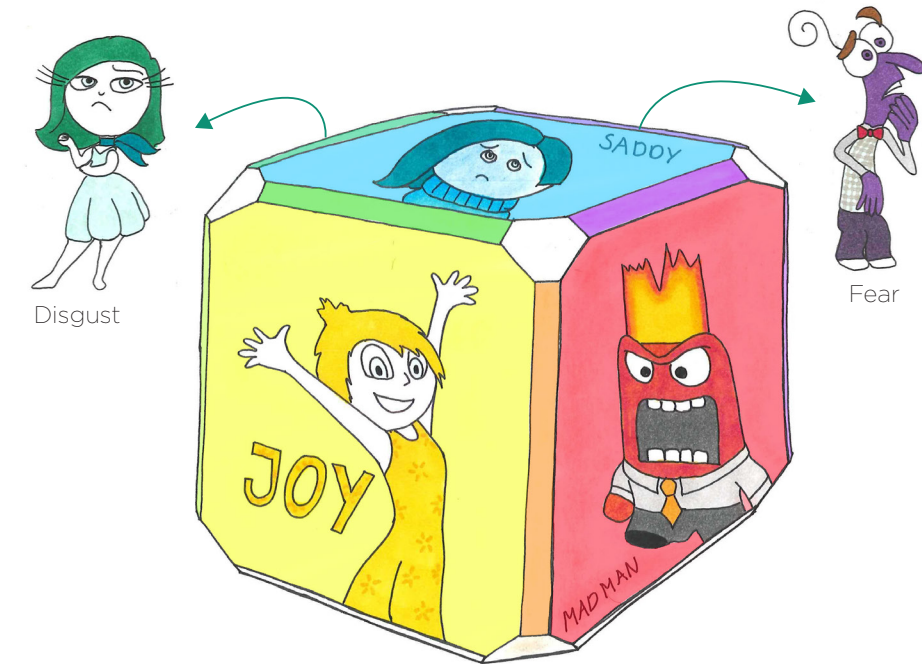
The child has a lot of self-control. The child is able to choose which activities he would like to do and at which level. To prevent the child from overestimating himself the child and teacher decide together which tasks the child will do.

Role classmates

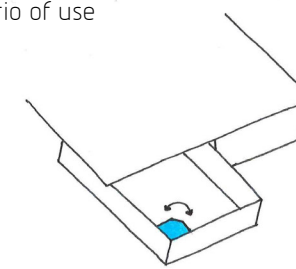
The role of the classmates is small in this concept direction. Before the child with cancer receives the booklet a group activity is organised. During this activity the children will create a character of themselves. These characters will be used in class, for example to indicate which children have to clean the room. The child with cancer can use this character in the booklet. At the end of the activity it will be explained that the child with cancer receives the booklet.

5.2 Concept direction 2

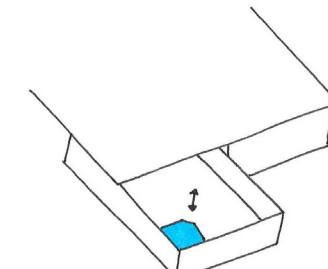
The second concept direction (figure #) is inspired by the movie "Inside out". Within the movie you can watch inside the brain of a 11 year old girl and see how emotions (joy, sadness, anger, fear, and disgust) influence her life.



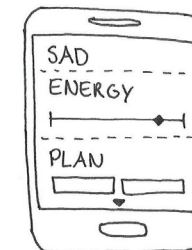
Scenario of use



1. Child can express his/her emotion by putting the emotions he/she is feeling on top of the cube.



2. The child can change the size of the cube to express his/her level of energy.



3. The teacher can see the mood of the child in an application. The application also gives an example of a planning for the child.



4. Based on the example planning the teacher can choose cards with tasks for the child with the suitable level of difficulty. The level of difficulty is indicated with colours.

Figure 43: Concept direction 2

5.2.1 Key elements

The key elements are as followed implemented in the concept direction:

Emotions & Energy level

The emotions and energy level can be expressed by the child in a cube. This is done by putting the emotions the child feels on top and choose the size which represents the energy level of the child. The emotions on the cube are the emotions of the movie "Inside out". By combining these emotions other emotions can be created. The child can express himself with an a easy and quick interaction to stimulate the child to express himself and change it throughout the day.

The information from the cube is send to the teacher in an application.

Planning & Evaluation

Based on the information from the cube, the application gives an advice about the planning for the child. If the child is not feeling well the planning will be less intensive and less difficult. The teacher can communicate the planning to the child by given cards with tasks to the child. The child can indicate on the cards how the tasks went with smileys.

Self-control

The child has limited self-control. The child can decide which tasks he will do from the tasks presented on the cards.

Role classmates

The classmates are part of the concept direction by given all children cards and not only the child with cancer. The cards are the same, however the classmates have to fill out the cards themselves based on the classical instruction from the teacher, while the child with cancer receives a filled out card. The cube is kept in the drawer of the child, so only the teacher can see how the child is feeling. This should give the child a secure feeling of expressing himself.

5.3 Comparison concept directions

The concept directions are compared based on several aspects: suitability for children with cancer, suitability for teachers, suitability of the role of the classmates, and feasibility. This comparison can be found in below

Suitability for children with cancer

Concept direction 1:

- + The child has a lot of self-control.
- + The child has the possibility to explain his emotions and energy level.
- The feelings of the child and the planning are filled out at the beginning of the day and are not possible to change during the day.
- The child needs to write a lot, while the treatment effects the fine motor skills.
- Filling out the booklet takes a lot of time, while the child just wants to do the same as his classmates.

Concept direction 2:

- + The child is able to communicate his emotions and energy level quickly.
- + The child can change his emotions and energy level throughout the day.
- + The child is able to communicate his emotions easily, since the emotions are made visible and recognisable.
- The child is not able to explain the reason for his emotions and energy level.

Suitability for teachers

Concept direction 1:

- + Detailed information about the child.
- Time consuming.
- Not flexible
- Limited possibilities to guide the child.

Concept direction 2:

- + Flexible.
- + Time efficient.
- + Guidance in the meaning of the emotions and energy level.
- + Gives an overview quickly and easily
- Depending on the application, less possibilities for own input.

Suitability of the role of the classmates

Concept direction 1:

- + The group activity informs the classmates in a fun way.
- The child with cancer will feel special due to the booklet.

Concept direction 2:

- + The child with cancer will not feel special, since the other children have cards as well.
- The child has to change the cube secretly, otherwise classmates may question what it is.

Feasibility

Concept direction 1:

- + Easy to produce with low costs.
- + Easy to implement in class, since it is similar to what is already used.

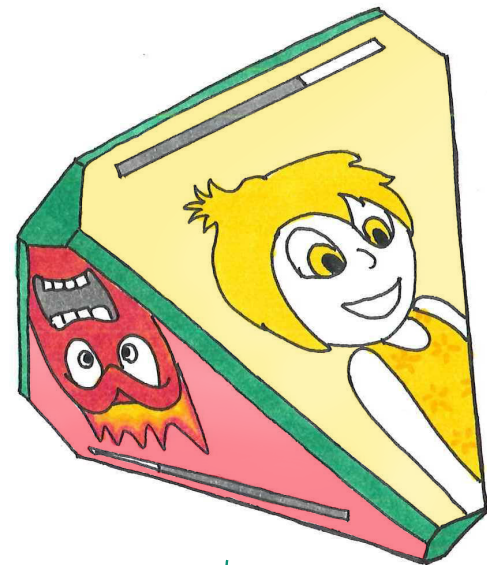
Concept direction 2:

- + Connected to the trend of making learning visible and differentiation in the classroom.
- Difficult to produce and expensive.

Based on this comparison I decided to continue with the second concept direction, since this concept direction is much more suitable for children with cancer and teachers than concept direction 1. The idea of the group activity of concept direction 1 is very interesting and will therefore be combined with concept direction 2. Ideas are generated to create a preliminary concept proposal, which is presented in the next appendix.

T Preliminary Concept Proposal

Concept direction 1 and the group activity of concept direction 2 were the starting point for the ideation to create the preliminary concept proposal. Figure 44 shows the preliminary concept proposal as how it was presented during the evaluation as explained in appendix B. 16.



1. Pyramid-shaped block

This pyramid-shaped block is a personal product for the child. The child can express his/her emotions by putting the emotions he/she is feeling on top. Next to this, the child can show his/her energy level visualised in the grey bar. The block can be kept in the drawer of the child. Due to this, the child is able to privately share his mood and be change it throughout the day. The characters on the block can be personalised by the child during the group activity. The emotions on the block are: Joy, sadness, anger, and fear.

Main function

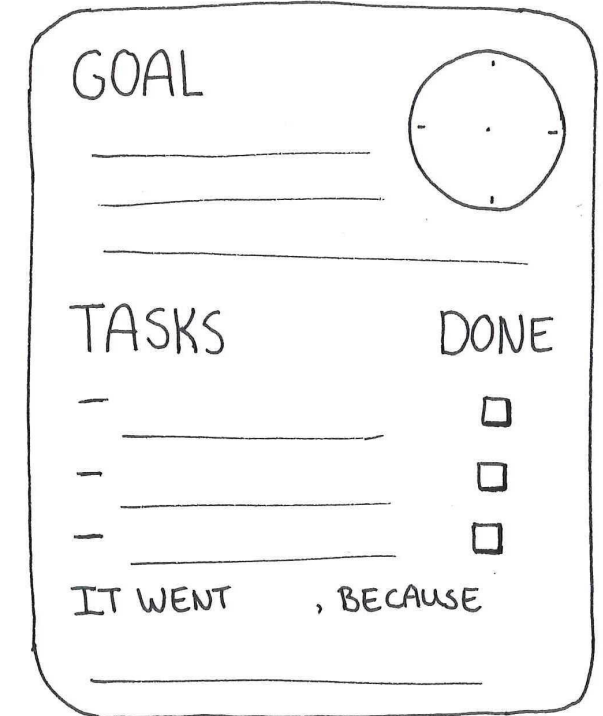
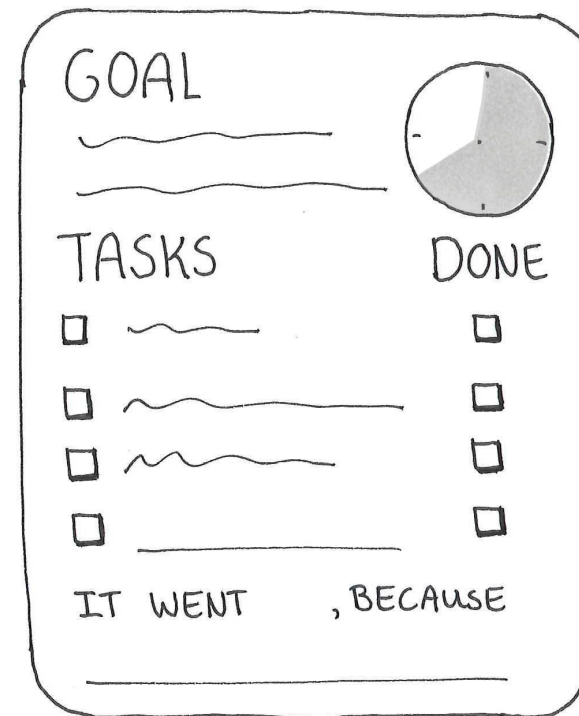
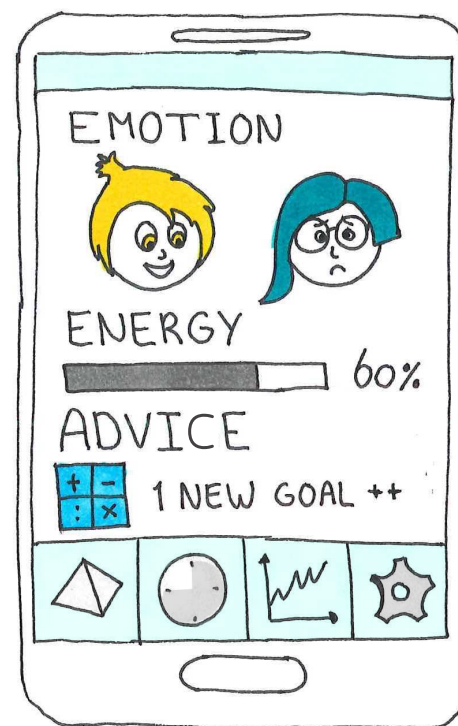
Support the child in expressing his/her emotions and energy level.

2. Application

Within this application the teacher is able to see the mood of the child and an advice on what to expect from the child in terms of goals to be reached. The advise is based on the emotions and energy level of the child, the schedule for the day, and the starting level of the child. The application also gives the possibility to get an overview of the mood of the child over time.

Main function

Communicate the mood of the child and give the teacher advice on what to expect from the child.



3. Cards

The card at the left can be used by the teacher to communicate the goal, tasks, and duration of the activity to the child. Other children receive empty cards (card at the right), which they can fill out themselves. Due to this the sick child does not get the feeling of being treated differently. At the bottom of the cards, the children can have a brief reflection on the activity. This helps the teacher to get a better understanding of the children and together with presenting the goal it makes learning visible.

Main function

Communicate the goal and tasks to the child.

Figure 44: Preliminary concept proposal

U Concept Proposal

This appendix elaborates on several aspects of the concept proposal presented in chapter 5.

U.1

An overview of the stickers the children receive and an empty one to draw themselves can be seen in figure 45.



Figure 45: Overview stickers (based on ToonJam (2017), Pinterest (n.d.a), Coloud headphones(n.d.), Clipartbest (n.d.), Aleksandr Vector (n.d.), Canstockphoto (n.d.), Pinterest (n.d.b), and Shutterstock (n.d.))

U.2 Lesson - Mood

The lesson about mood (figure 46) are part of the introduction of the 'Gevoelens medaille' in class. Below the goals of the lesson and the envisioned method are explained.



Figure 46: Lesson mood

U.2.1 Goals

At the end of the lesson children are able to:

- explain what mood is
- name the 6 principle mood states
- recognise these 6 mood states
- understand the influence of mood on the school performance and behaviour
- understand the impact of cancer and its treatment on mood (if the sick child wants to discuss this)

U.2.2 Method

The lesson is set up as following:

- Teacher explains the goals.
- Whole class brainstorm about what children already know about mood.
- Presentation about mood and the 6 mood states.
- Experiencing the mood states in small groups by discussing and acting out one mood state per group.
- Each group acts out the mood state discussed during the previous step. The other classmates have
- to guess which mood state is acted out.

- Presentation about the effects of mood on school performance and behaviour.
- Presentation about the impact of cancer and its treatment on mood (if the sick child wants to)
- Close of by reflecting on the goals of the lesson.

U.3 Lesson - Energy

Together with the lesson about mood, forms the lesson about energy the introduction of the 'Gevoelens medaille' in class. Below the goals of this lesson and the envisioned method are explained.

U.3.1 Goals

At the end of the lesson children are able to:

- explain what energy is
- understand how energy is gained
- recognise a high and low energy level
- understand the influence of the energy level on the school performance and behaviour
- understand the impact of cancer and its treatment

on energy level (if the sick child wants to discuss this)

U.3.2 Method

The method of the lesson about energy is similar to the method of the lesson about mood.

- Teacher explains the goals
- Whole class brainstorm about what children already know about energy.
- Presentation about what energy is.
- Performing experiments in small groups to see the effects on their energy level (e.g. running around or eating sugar)
- Each group presents their finding to the whole class
- Presentation about the effects of energy on school performance and behaviour.
- Presentation about the impact of cancer and its treatment on the energy level (if the sick child wants to)
- Close of by reflecting on the goals of the lesson.
- Introducing and testing the 'Gevoelens medaille'

U.4 Lesson – Reflecting

To introduce the 'Mijn les'-cards a lesson is given about reflecting. The goals of this lesson and the envisioned method are explained below (figure 47).



Figure 47: Lesson reflecting

U.4.1 Goals

At the end of the lesson children are able to:

- explain what reflecting is
- why you can reflect
- how they can reflect
- how to use the 'Mijn les'-cards

U.4.2 Method

The set up of the lesson is:

- Teacher explains the goals.
- Whole class brainstorm about what children already know about reflecting.
- Presentation about what is reflecting
- Performing a short task in small groups
- Reflect with the group on the performed task
- Presentation about the functions of reflecting
- Performing a second short task in small groups
- Reflect in the small group on the performed task
- Presentation about how to reflect
- Performing an individual task
- Reflect on the task
- Explanation of the 'Mijn les'-card
- Filling out a card together
- (- Using the 'Mijn les'-card during the next lesson)

The tasks which the children will perform will be added in the folder of the teacher and be made available on the website.

Chapter 6 presented the evaluation of the concept proposal with a focus on the conclusion. This appendix discusses the evaluation in detail.

V.1 Goal

The concept proposal is evaluated to define to what extent teachers and children experience the set design goal, requirements, and wishes. Based on their experience recommendations are formulated to optimise the concept proposal.

V.2 Research questions

To reach the goal, research questions were formulated for both the children and teachers. Sub questions are formulated based on the requirements and wishes.

1. How do children and teachers experience the support for the children to express their emotional and physical state?

- Do children feel supported in expressing their mood throughout the day?
- Do children feel supported in expressing their energy level throughout the day in a understandable way for children?
- Do children get a feeling of self-control?
- Do teachers feel supported in understanding the mood easily and quickly?
- Do teachers feel supported in understanding the energy level easily and quickly?
- Do children understand how to set their mood state and are they able to do this?
- Do children understand how to set their energy level and are they able to do this?
- Do teachers feel supported to communicate with the child about the child's mood and energy level?
- Do teachers feel confident and informed while using the product and creating the personalised planning?
- Do children feel invited to use the product/service?
- Are children appealed by the product/service?
- Do teachers feel invited to use the product/service?
- Are teachers appealed by the product/service?

2. How do the children and teachers experience the support of creating a suitable individual planning together?

- Do children feel supported in communicating with their teacher about their mood, emotions, energy level, and personalised planning?
- Do children get a feeling of self-control?
- Do teachers feel supported in creating the personalised planning?
- Do children feel involved in creating the personalised planning?
- Do teachers feel supported to communicate with the child about the individual planning?
- Do teachers feel confident and informed while using the product and creating the personalised planning?
- Do children feel invited to use the product/service?
- Are children appealed by the product/service?
- Do teachers feel invited to use the product/service?
- Are teachers appealed by the product/service?

3. How do children and teachers experience the implementation of the 'Humeur adviseur'?

- Does the sick child feel safe to use the product?
- Does the implementation fit into the regular education plan?

4. How does the 'Humeur adviseur' and its implementation fit into the school system?

- Do teachers have the feeling the product/service fits the school context?
- Are children able to use the product/service in a short time?
- Do children not feel their regular school experience is disturbed?
- Do children not feel they are put in the centre of attention?
- Do children have the feeling they belong to the group while using the product?
- Do children feel secure, understood, and control

while using the product/service?

- Are teachers able to use the product/service in a short time during school hours?
- Do teachers have the feeling the product/service fits the school context?
- Do teachers have the feeling the product/service fits the school context?

V.3 Method

As explained in chapter 6 two methods were used to evaluate the concept proposal. Chapter 6 described the participants and the set up. Below the set up is elaborated with extra example questions and the used research materials are showed in detail.

V.3.1 Set up

In the next paragraphs extra example questions are given which were used as guidance during the evaluation. The evaluations were conducted in Dutch, therefore the questions are presented in Dutch.

Interview with teachers

3. Scenario:

Kunt u een situatie beschrijven waarbij u dit probleem ervaren heeft? (U onder-/overschatte de leerling)

4. Appearance:

Wat vind je hiervan? Niet te jongens-/meisjesachtig? Of kinderachtig?

Is de leskaart duidelijk gestructureerd?

Wat vindt u van de namen 'Humeur adviseur', 'Mijn humeur' en 'Mijn les'?

5. Product:

Wat zou u ervan vinden dat u kan zien hoe de leerling zich voelt (humeur en energie)?

Zou u het helpen om de leerling beter te begrijpen (humeur en energie)? En dus minder de leerling te onder-/overschatten?

Voelt u zich gestimuleerd/geholpen om meer met de leerling te praten over zijn/haar gevoel? En hebben u en/of de leerling daar behoefte aan?

Zou het product u ook helpen met het bedenken van een individueel plan, de taken voor de leerling in de komende les/dag? Zo ja hoe? Hoe zou u de informatie gebruiken? Zou u daar hulp bij nodig hebben?

Zou u het product zien als het op de tafel van de leerling ligt? Zou u gedurende de dag tijd hebben om ernaar te kijken en er rekening mee te houden? Voelt het uitnodigend?

Zou het binnen de schoolcontext passen?

Zie je jezelf dit product zien gebruiken in de klas? Zo ja, kun je een voorbeeld geven van wanneer je dit zou gebruiken?

6. Cards:

Wat vindt u van de inhoud van de kaarten? Doel, taken, reflectie en notes leraar. Kunnen kinderen reflecteren?

Wat vindt u ervan dat u de taken aanpast op het humeur en het energie level van de leerling? En niet bijvoorbeeld doel? Zou het helpen om de leerling niet te over-/onderschatten?

Hoe zou u de taken aanpassen? Zou u daar hulp voor willen hebben? Zoja wat voor iets?

Wat vindt u ervan dat de kaarten per les zijn? En niet bijvoorbeeld per dag of dagdeel, zou dit ook mogelijk zijn?

Heeft u tijd om het voor iedere les in te vullen? Is het uitnodigend?

7. Implementation:

Wat vind je ervan dat de leerling het krijgt van de educatieve voorziening en vervolgens de map aan de juf/meester geeft?

Denk je dat een juf/meester het zou gaan gebruiken als hij/zij het van de leerling krijgt? Of is er nog extra info nodig?

Zou het nodig zijn om dit boekje in te vullen om elkaar te kunnen begrijpen?

Zou het boekje de leerling helpen om later de 'Mijn humeur' in te vullen? Of zou je dit met de hele klas willen doen?

Wat vind je van een presentatie aan de hele klas om het product uit te leggen? Moet de juf die geven of juist de leerling zelf? Is het nodig om de presentatie te geven?

Moet het benoemd worden dat het voor de zieke leerling is of juist niet?

Zou dit een goede manier zijn om het te introduceren in de klas?

Interview with girl with brain tumour and/or mother

2. Cancer and school:

Op welke basisschool heb je gezeten? Leuk, minder leuk.

Ik begreep dat je ziek bent geworden toen je op de basisschool zat. In welke groep zat je toen?

Kun je misschien vertellen hoe het gegaan is nadat je hoorde dat je ziek was? (Hoe ging de behandeling? Welke vorm kanker had je?)

Ging je gedurende de behandeling naar school? Hoe veranderde school doordat je kanker had? Wat

voor maatregelen zijn er getroffen op school? Hoe gingen de juf/meester en klasgenoten daarmee om?

Wat vond je het leukste van school?

Wat vond je met minst leuke van school?

3. Scenario:

Kan je je nog een moment herinneren dat de juf/meester iets van je vroeg wat te moeilijk of zwaar of juist te makkelijk was voor jou?

Kan je je nog een moment herinneren op school dat je zelf te veel wilde doen, eigenlijk meer dan dat je aankon, of dat juist achteraf bleek dat je toch meer kon dan je dacht?

4. Appearance:

Wat vind je hiervan?

Wat vind je er mooi aan?

Wat vind je minder mooi?

Herken je de humeurs?

5. Product:

Passen de humeuren op het product bij hoe jij je gevoelt hebt? Welke mag eventueel weg en welke moet erbij? Zou je ook neutraal of anoniem willen?

Wat vind je van het instellen van je humeur (draaien)? Kun je in het product je energie op de juiste manier weergeven dat past bij hoe jij je gevoelt hebt?

Zou je het altijd eerlijk invullen? Voel je je veilig om het eerlijk in te vullen?

Wanneer zou je het instellen? Zou je het aanpassen als je je gedurende de dag je anders voelt?

Wat vind je ervan dat je juf/meester kan zien hoe je je voelt (humeur en energie)?

Wat vind je ervan dat je klasgenoten kunnen zien hoe je je voelt (humeur en energie)?

Wat vind je ervan dat alleen jij dit product hebt (en niet je klasgenoten)? Heb je het gevoel dat je dat anders maakt of nadruk legt op dat jij ziek bent?

Zie je jezelf dit product gebruiken in de klas? Zo ja, kun je een voorbeeld geven van wanneer je dit zou gebruiken?

6. Cards:

Wat vind je ervan om dat je juf/meester via de kaart laat weten wat je kan gaan doen tijdens de les?

Wat vind je ervan dat de juf/meester eerst een aantal taken opschrijft en jij aan de hand daarvan kan kiezen wat je wil doen?

Heb je het idee dat je samen met je juf/meester bepaald wat je bij de les gaat doen?

Zou het helpen om jezelf niet te over- of onderschatten?

Wat vind je ervan dat de hele klas de kaarten gebruikt, maar jij dus wel op een andere manier?

Zou je tegen je klasgenoten zeggen dat de juf/meester de kaarten voor jou al invult? Heb je het

gevoel dat je dat anders maakt of nadruk legt op dat jij ziek bent?

Interview personalisation

Wat vond je ervan om hem zelf te versieren?

Vind je hem mooi?

Wat vond je van de stickers met de lichamen (kleuren, houding, kleding, stijl)? Paste er één echt bij jou?

Zijn er nog dingen die je wel graag erop had gewild, maar waar geen sticker van was?

Voelt het nu als iets van je zelf?

Interview appearance

2. General:

Wat vind je er mooi aan? Waarom?

Wat vind je minder mooi? Waarom?

Ranking vragen

3. Product:

Wat vind je van de?

a. kleuren

b. vorm

c. grootte

d. plaatjes (de poppetjes)

Wat vind je van de jongens en meisjes variant? Welke zou jij willen hebben?

4. Cards:

Wat vind je van de?

a. kleuren

b. grootte

c. plaatjes (duimen, vulpen, vraagteken)

d. tekst (goed leesbaar, weten wat in te vullen, genoeg schrijfruimte)

e. structuur

f. lay-out

Interview functionalities and interaction cards

2. General:

Hoe ging het invullen van de kaart?

Wat vond je makkelijk om in te vullen?

Wat vond je moeilijk om in te vullen?

3. Content cards:

Hoe vond je het om op te schrijven wat je aan het eind van de les kan?

Wat vond je ervan om op te schrijven wat je die les ging doen?

Kon je ook uitleggen waarom je voor een bepaalde duim hebt gekozen?

Wat vind je ervan dat de juf wat op je kaart kan schrijven, zoals goed gedaan of juist een tip om beter te werken?

Wat zou je ervan vinden als de juf juist niets op de

kaart zou zitten?

4. Effects

Denk je dat de kaarten je helpen om beter te werken?

Zo ja, waarom/hoe?

Als je zelf mag kiezen om de kaarten te gebruiken, zou je ze dan gebruiken? Zo ja, wanneer?

Wat zou je ervan vinden als je de kaarten voor iedere les zou moeten invullen?

Interview functionalities and interaction product

2. General:

2.1. Hoe is het gegaan?

2.2. Was de uitleg duidelijk?

2.3. Wat vond je makkelijk?

2.4. Wat vond je moeilijk?

3. Product

Passen de emoties op het product bij hoe jij je gevoelt hebt? Welke mag eventueel weg en welke moet erbij? Zou je ook neutraal of anoniem willen?

Wat vind je van het instellen van je humeur (draaien)?

Kun je in het product je energie op de juiste manier weergeven dat past bij hoe jij je gevoeld hebt?

Wat vind je van het instellen van je energie niveau (schuif)?

Heb je het altijd eerlijk ingevuld? Voelde je je veilig om het eerlijk in te vullen?

4. Cards

Heb je de informatie van het product (humeur en energie) gebruikt voor het invullen van de kaarten?

Zo ja, hoe/wanneer/waarvoor?

Wat vind je ervan om dat je juf/meester via de kaart laat weten wat je kan gaan doen tijdens de les?

Wat vind je ervan dat de juf/meester eerst een aantal taken opschrijft en jij aan de hand daarvan kan kiezen wat je wil doen?

Heb je het idee dat je samen met je juf/meester bepaald wat je bij de les gaat doen?

Follow up interview with teacher

2. General

Hoe vond je het gaan?

Wat ging goed?

Wat ging minder goed?

3. Product

Wat vond je van het product?

Wat ging goed?

Wat ging minder goed?

Heb je de hele dag tijd gehad om te kijken naar hoe de leerling zich voelde en er eventueel wat te mee doen?

Kon je van een afstand zien hoe de leerling zich

voelde of moest je er echt dicht bij staan? Waar keek je naar? Kleuren of poppetjes?

Wat vond je ervan dat je kon zien hoe de leerling zich voelde (humeur en energie)? Denk je dat de leerlingen het altijd eerlijk zou invullen?

Wat heb je met de informatie gedaan?

4. Cards

Wat vond je van de kaarten?

Wat vind je van de inhoud van de kaarten? (Doel, taken, tijd, reflectie, noties leraar)

Passen de kaarten bij jouw lessen?

Konden de kinderen het invullen zonder hulp?

Wat vond je ervan dat je voor één leerling (de zieke leerling) de kaart in moest vullen? Had je hier tijd voor?

Lukte het om de taken op de kaart ter plekke aan te passen aan hoe de leerling zich voelde? Hoe heb je dit gedaan?

Wat vond je ervan dat de leerling daarna mocht aankruisen welke taken hij wil gaan doen?

V.3.2. Analysis

The results, after they were typed out based on the video and audio recordings, were clustered. These clusters were used to answer the research questions and formulate recommendations.

V.4 Results

Figure 48 shows the results of the evaluation which are used to optimise the 'Humeur adviseur' to as how it is presented in chapter 5.

Figure 49 and 50 show the results of the interviews.

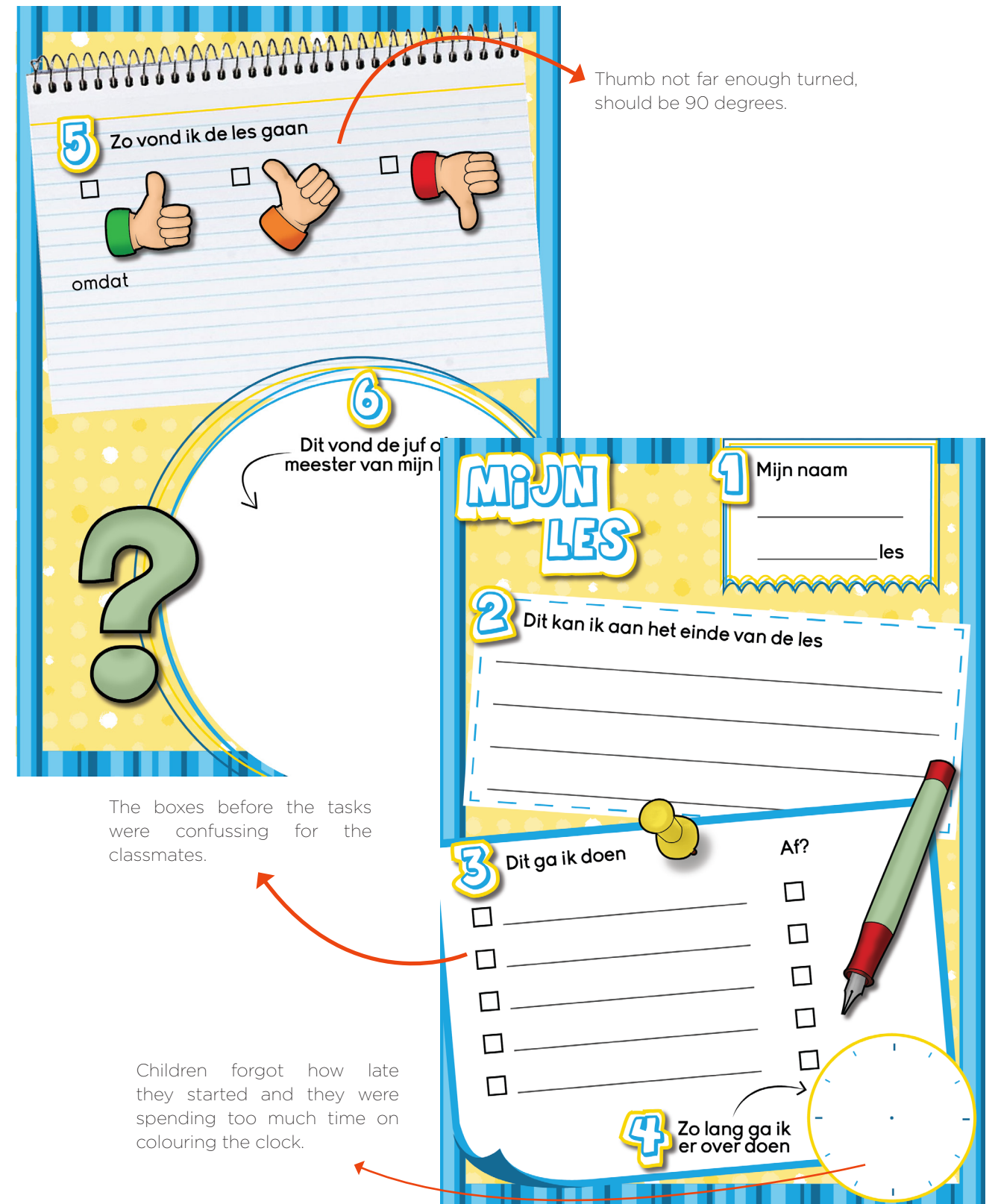


Figure 48: Cards as evaluated with changes highlighted

EF consultant

"wat een leuk ontwerp, erg leuke vorm en stijl. Ik denk dat kinderen dit erg aanspreekt."

"je een veilige plek hebt, waarbij het is uitgelegd, dan vullen kinderen het sneller eerlijk in. Ligt denk ik aan de wijze waarop je het introduceert. Misschien werkt het ook beter als iedereen het heeft, dan ben je geen uitzondering."

"Als ik weet dat de leerling veel aan zijn hoofd heeft en ik weet wat ik dan moet doen, dan helpt mij dat om het kind te kunnen bieden wat die nodig heeft. Als je het niet weet of het kind niet kan uiten, heb je ook geen handvat om het kind te kunnen helpen."

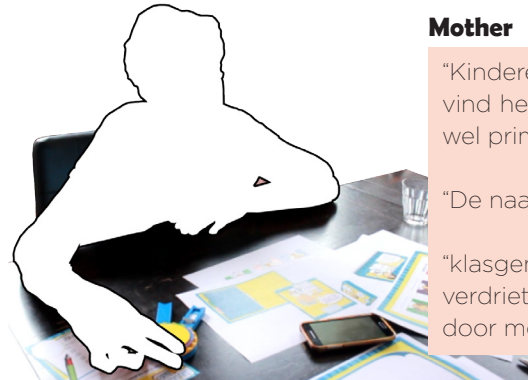


Mother

"Kinderen willen niet te anders zijn en willen niet te veel op tafel. maar ik vind het wel positief en vrolijk. Al die kleurtjes, ik denk dat kinderen dat wel prima vinden"

"De naam humeur adviseur vind ik wat negatief klinken"

"klasgenoten zullen denk ik minder snel hulp aanbieden. Als een kind verdrietig is, hangen ze er misschien even om heen maar dan willen ze door met hun eigen ding. Dat ligt aan de leeftijd"



Teacher/IC

"Heel veel kinderen willen niet meteen iets zeggen, dus als je het op een makkelijke manier kan laten zien zal dat echt wel werken."

"Denk niet dat kinderen het altijd eerlijk zouden invullen. Maar als ze er achter komen dat als ze eerlijk zijn de juf of meester een goede reactie geeft, zullen ze het wel eerlijk doen."

"Eerste oog, kleur gebruik, leuk, mooi, sprankelend trekt aan. Blijf er naar kijken. Overzichtelijk, niet te druk. Ziet er mooi uit."

"Doel kun je normaal niet aanpassen, ik zou vooral kijken naar andere opdrachten. Manier waarop je doel wilt halen ga je dan veranderen."



Child with brain tumour and mother

"Voor mijn dochter zou dit een goede uitkomst zijn. Omdat ze stilletjes is, ze is een doorzetter. Klaagt nooit. Op deze manier kan ze toch haar energie en emoties aangeven"

"Voor mij zou het niet uitmaken of hij op tafel ligt of in mijn laatje, ik zou het altijd eerlijk invullen"

"De kaarten zal ik denk ik niet gebruiken, spreekt mij minder aan"



Figure 49: Results interview

"ik was een beetje boos op klasgenoot, maar toen heb ik hem wel op boos gezet, en toen trok zij een boos gezicht naar mij"

"Als ik zie dat een klasgenoot verdrietig is en ze wordt al geholpen dan zou ik niet helpen, maar anders zou ik het wel vragen en haar een beetje helpen."

"Draaien ging wel goed, maar dacht eerst dat je aan het gele moest draaien. Energie, ging goed. Wel makkelijk om in te stellen."

"Fijn als opdrachten en tijd is opgeschreven, want dan weet ik wat ik moet doen en hoelang ik nog heb, eigenlijk moet ook de tijd er nog bij staan hoelang je begonnen bent"

"Ik vond het wel moeilijk, vooral de opdrachten is moeilijk, tijd inschatten is ook lastig. het doel opschrijven is makkelijk"

"Mijn moeder had kanker, met de juf schreef ik toen in een schriftje hoe ik me voelde, maar dit is veel handiger en leuker"

"Ik zou de niet iedere dag willen gebruiken want dan heb je minder tijd om te werken."

"leskaarten zijn onhandig, want wat moet ik met die vakjes ervoor doen?"

"als ik me verdrietig voel dan word ik al weer vrolijk als ik hier naar kijk, de stickers zijn leuk!"

"Het is fijn als de juf feedback geeft, want dan weet je wat je de volgende keer beter kan doen"

"humeur adviseur is wel een grappige naam, maar het is een medaille dus misschien is de gevoelend medaille een leuke naam"



Figure 50: Results user study

V.5 Conclusion

Based on the results the research questions are answered.

V.5.1 How do children and teachers experience the support for the children to express their emotional and physical state?

As presented in chapter 6, the participants were enthusiastic about the product and all were willing to use the product. Below all insights about the product are shown and explained.

Ease of expressing

The main advantage of the product mentioned by the participants was the ease of expressing. In the current situation the children have to talk to their teacher to express themselves, however this is difficult and a large threshold for children. The participants indicated that this is solved by the ease of expressing with the product.

One of the classmates of the children who used the product said: "My mother had cancer. In that time, I had a conversation with my teacher and a notebook in which I wrote down thing I wanted to share. This is much easier than a conversation and notebook. I would have liked it, since this is much easier."

The participants indicated that this is established by three reasons:

First of all the product lays on the table due to which the children can change it when they feel the need to do so. The children, who used the product in class, have changed the mood and energy level several times during the day.

Furthermore the children can show their feelings without talking about it, which is easier for children.

Finally, it is a more anonymous way to express themselves. By showing your mood not directly to someone, the children will feel more at ease by expressing themselves.

Stimulates to think about mood

The teachers mentioned that the product would stimulate children to think about their mood, since the product is laying on their table and looks

appealing. The mother of the survivor mentioned that the product helps children to remind it is fine to be angry and that it helps to understand that it influences their work.

Stimulates conversation

The product makes it possible for the teacher to easily see the mood and energy level of the child. The mood is most easy to understand due to the colours. The energy level was more difficult to understand due to the use of the same colour within the bar. The teachers would all use the product as a conversation starter and reminder to take mood and energy level into account. It helped them to go quickly to the right feelings. One of the teachers mentioned that this may not take over the conversation, since it would become too superficial. The conversation is crucial.

Honest

The teachers mentioned that they were doubting if the children would dare to honestly show their mood. They explained that a safe environment will be crucial which can be created by a good implementation of the product. Next to this, they mentioned that they expect children to fill it out honestly if they experienced the advantages of doing so.

The children who used the product did dare to show their mood honestly. The boy did not had any problems with showing it. The girl mentioned that there was one moment she did not really dared to show she was angry, since she was angry at her classmate sitting next to her. However she did show she was angry and it helped immediately since the classmate understood she was the reason for the angry mood state.

Finally, the teachers and mothers mentioned that it could be difficult to fill out for children who survived cancer. They will compare who they are feeling currently with how they were feeling during the treatment. Compared with that, the child will always feel happy and energetic. The moods shown by the product did match the feelings the children have had. There were only doubt about calm and it was proposed to add lonely and active. It was also discussed if it would be good to add anonymous, the advantage would be that children can use this when they do not want to talk about their mood, however it become a pitfall as well.

Role classmates

The classmates were a bit jealous that they may not use the product. The children who did used the product felt special and felt even proud. The reason for this was that only 2 children were going to use it and the shape, a medal, looks positive and as a price for the children.

The girl with a brain tumour mentioned she did not had a problem with only her having the product. She also has used other products and other children also used special products.

The classmates sitting close to the children using the product, indicated they sometimes looked at the product. Some children indicated that they were willing to help the child if he/she was not feeling well, while other children explained they were too busy to work on their own tasks.

At a certain moment the girl using the product turned the product upside down, because her classmates immediately looked at the 'Gevoelens medaille' when she changed it. She mentioned that she would be fine with the teacher always seeing how she is feeling.

Children have different needs

One of the teachers explained that she will always talk to a child when the child shows a negative mood state and before they continue their work she wants to see a positive mood state. The mother of a survivor explained that she thinks it is important to discuss with the child what he/she prefers. She explained that some children would like to talk, while another child prefers to keep working. This was also confirmed by the children who used the product. The boy did not wanted to talk when he placed the product on the angry mood state, while the girl was fine by talking about it.

The needs of the child should be discussed before using the product.

V.5.2 How do the children and teachers experience the support of creating a suitable planning together?

Below the insights with regard to creating the individual planning are presented

Together

As indicated by the girl with the brain tumour and as observed in class, the children do not write extra

tasks down. They first work on the tasks filled out by the teacher and if they have time left they would add extra task. Due to this the child is not as involved in creating the planning as envisioned. The boy who used the product explained: "I have the feeling my teacher decides what I had to do. But that is okay, since she does it for all children.". By letting the teacher writing down the tasks the feeling of the teacher deciding was even enlarged.

Furthermore the children who used the product both did not had the feeling the teacher used the information on the product to create the individual planning. The teacher indicated she looked at the 'Gevoelens medaille' and used it, together with the reason for the mood, to decide if she would change the tasks or not.

The teachers liked the idea of making the planning together. Most teachers thought it would be possible to let the children make their own planning and the teacher would check it during working.

Translating the information of the product During the interviews the teachers explained that they would give less and easier tasks if the child expresses a negative mood or has little energy. As observed the teacher only does that when the reason for the unpleasant mood is indeed influencing the work of the child. For example when the boy showed the angry mood because the boys behind him were annoying, the teacher did not gave less tasks.

As explained above, children have different needs. So the information of the product should also be translated differently for each child. The mother of the survivor explained that some children would like to work very hard when they are sad, while the other child would like to slow down a bit. Therefore instructions are needed, however these should be used as guidelines and not as strict rules.

Communication

The cards are used to communicate the individual planning and the reflection. Communicating the planning was perceived as normal. It reminded the teachers of 'weektaken'.

The reflection on the card for the children was good if the reflection was positive. Most teachers would like to have the conversation if the reflection was negative or for example if a certain trend was seen. Is these situations the teachers had the feeling the

conversation was needed.

The area for teachers to give feedback would only be used to give feedback to the child and not for themselves.

V.5.3 How do children and teachers experience the implementation of the ‘Humeur adviseur’?

Below all elements of the implementation are discussed

Provided by the EF

Some teachers would use the ‘Humeur adviseur’ if they received it from the child. Some would feel forced to use it, while others would like to use it for the child. Other teachers would take it not seriously if it was given by the child. Therefore some interviewed teachers advised to let a professional explain the teacher why it is needed.

On the other hand, there were teachers who explained that they had to do a lot of things provided by the direction or consultants, which they feel are not useful. In these situations it would be better that the child would give it to the teacher.

To conclude most teachers agreed on a combination. The child gives the ‘Humeur adviseur’ to the teacher, but before the teacher was informed about it by a professional.

Instruction folder

The instruction folder is really needed. The teachers indicated that the information should be short and visualised, so teachers can understand it easily.

Booklet

The booklet was really liked by the teachers. They indicated that they really liked the way of personalising the product. One teacher missed an empty sticker, so children could draw a body themselves. The strongest part of the booklet was the part in which the children explain what they expect from their teacher if they feel a certain mood. The teachers however indicated that the child would probably need help with answering that question. The booklet was perceived as a good conversation starter to discuss the needs and preferences of the

child.

As improvement for the booklet it was suggested to let children place a picture in the booklet to show the mood instead of drawing themselves in that mood.

Lessons

All teachers mentioned several times the importance of the introduction. After showing the lessons they reacted like: “This is exactly what I ment.”. They were positive about the way of introducing it into the class, however this should also be discussed with the sick child. The sick child must be involved into the introduction.

Lifecycle

The mother of the girl with a brain tumour doubted if teachers would be able to learn to recognise mood and energy. She explained that her daughter tries to hide if she is yawns or is tired. Furthermore she is quited, due to which she thinks teacher will not be able to get the same information as with the product.

V.5.4 How does the ‘Humeur adviseur’ and its implementation fit into the school system?

Below it is explained how well or not the ‘Humeur adviseur’ fits into the school context.

Appearance

All participants liked the appearance. The colours were outstanding and catchy, which made the ‘Humeur adviseur’ inviting. The shape of the product is positive and something to be proud of. The size is perfect for at the table and in the drawer. It was doubted if the ‘Gevoelens medaille’ was sturdy enough for in the drawer and the separate cards were disliked.

The teachers indicated that the appearance fit the school context and the children mentioned that it looks better than the rest of their school materials.

On the cards the orange thumb was a bit confusing, since it was not turned 90 degrees. The checkmarks before the tasks were also confusing for the classmates. They did not understand why there was a checkbox before and after the task. The children spend too much time on colouring the time on

the clock. Furthermore the children missed the information when they started and when they had to stop.

Known

Emotions is a hot item at most schools, due to which the lesson about mood and the product would fit into the education. However not all schools are education children about this, so for them it would be very new and could be difficult to use.

The cards reminded the teacher of ‘weektaken’ and the different elements of the cards were known. They said this would fit in the current trend of making learning visible. The goal was difficult to fill out by the children, however it was expected by doing it more often the children would become better in filling this out. Which was similar for explaining the reason for the thumb.

Name

The name was liked, since it rhymes. However most children did not understand the words ‘humeur’ and ‘adviseur’.

Time

The cards were used for all language and calculation lessons. Due to this, the teachers has to look at a lot of cards and has definitely not enough time to give feedback on all cards. Furthermore using the cards for so many lessons would become boring. As was seen on the filled out cards, the children wrote down less during the later lessons. Teachers and children would like to use it for a selected amount of lessons, for example the difficult lessons.

Let children fill out the cards themselves, and the teacher for the sick child, was perfectly possible.

What teachers do like to have is an sheet to create an overview in which they can keep track of how children are doing. This should be a simple overview in which the can make notes about important things. They would also use it to get insight into the self-confidence and self-image of the child.

V.6 Discussion

Below an overview of the most important points of discussion can be found.

V.6.1 Participants

It was not possible to find participants within the target, therefore it was chosen to ask participants as close to the target group as possible. Due to this the participants had to imagine themselves in the situation targeted, which made answering the questions more difficult and the results less reliable.

The amount of participants was low. For each part of the evaluation only 1 to 3 participants participated. Furthermore the girl with the brain tumour did not recognise the problem of being over- or underestimated by her teacher and was very quiet, due to which only limited results were obtained during the interview. Due to this the results were less reliable. The participants did had different backgrounds, due to which the concept proposal is evaluated from different perspectives.

At last most of the participants participated before, due to which they were biased. Their opinions and feedback is used to create the concept proposal, due to which they probably had a more positive attitude towards the concept proposal. On the other hand, since I was familiar to the participants they felt more at ease.

V.6.2 Context

Parts of the evaluation existed of only interviews, due to which the context of use was missing. Due to this the participants had to imagine themselves within the context. This made the results less reliable.

By letting participants using the ‘Humeur adviseur’ at school, the context became more as the targeted context. However within the class there was no sick child, due to which this context differed as well. The practical use of the design and the cards were possible to evaluate within this context as how they were envisioned.

At last the concept proposal is used for only a day within the class. However long term use is envisioned. Questions are asked about the how the participant imagine the long term use, however this was, especially for the children, difficult to imagine.

V.6.3 Research materials

The prototypes of the product and the cards

were high fidelity, due to which the interaction with the product could be evaluated with reliable results. The prototypes also helped in explaining and understanding the concept proposal. A disadvantage of the high fidelity prototypes could be that participants did not dare to give negative feedback.

V.6.4 Questions

The questions for the children appeared to be too difficult to answer for the children. The children for example did not understand the word 'hip' (Dutch for fashionable) and not all children were able to explain their answers.

Furthermore a few of the questions were biased. The questions were made based on the requirements and wishes and some of these questions could have steered the participants into answers. An example of such a question was: Would you or the child feel stimulated to think/talk about the child's feelings?. Most participants mentioned this already before, however by asking it directly they all agreed on it.

Based on the results and conclusion of the evaluation and the requirements and wishes a list of recommendations is created.

W.1 'Gevoelens medaille'-product

The product was experienced as positive however a few elements can be improved.

W.1.1 Turning wheel

All participants thought they had to turn the yellow part on top of the turning wheel to change the mood. Therefore it should be made more clear, the part with the moods is the turning wheel. Furthermore it should be investigated if children with side effects as problems with the fine motor skills are able to turn the wheel.

W.1.2 Attachment clip

The clip to attach the product is fragile and does not make it possible to attach it firmly to different objects. The clip should be redesigned, but must make it possible to place the product flat on a table.

W.1.3 Sturdiness

The product looks a bit fragile and it is questioned if the product is robust enough for long time use and for example to be placed in the drawer of a child.

W.1.4 Personalisation

The stickers to personalise the product were liked and all children had the feeling they were able to personalise it in a way they liked. Based on the results of the evaluation it was decided to add empty stickers as well and add an example. To optimise the personalisation it could be considered to produce the product in different colours and add different options for heads expressing the moods. For example different hair, eyes or skin colour. Due to this children are better able to relate to the moods expressed.

W.1.5 Anonymous

Not all children will want to show their mood and

energy level to their classmates and/or teacher all the time. It could be considered to redesign the 'Gevoelens medaille' for example by adding anonymous. This could become a pitfall if children are going to use it, if they do not want to think about their mood and energy.

W.2 'Mijn les'-Cards

The cards have some larger points for improvement.

W.2.1 Scenario of use

Within the evaluated concept proposal it was envisioned the cards were used for each language and calculation lesson. During the evaluation it appeared that this will not work properly. The children stopped filling out all elements and for teachers it is not possible to check all cards of all children. Therefore it was chosen to use the cards for the difficult lessons and for the child with cancer for all language and calculation lessons. It should be further explored if this is the best way of using the cards.

W.2.2 Influence of the sick child on the tasks

The children who used the product within class did not have the feeling they were part of making the planning. They had the feeling their teacher decided which tasks they had to make and they did not add extra tasks, since they first wanted to finish the tasks of the teacher. It is recommended to include the child more within deciding which tasks he will do to stimulate the feeling of self-control.

The classmates indicated the checkboxes in front of the tasks, which are used by the sick child to indicate which tasks he/she wants to do, were confusing. Therefore these checkboxes are changed from squares into rounds.

W.2.3 Feedback teacher

The cards provide an area for teacher to give children

feedback or write down notes for themselves. However teachers indicated that it is not likely that they will use this area often and they will never use it to make notes for themselves. Therefore it could be considered to change and discard this area. What teacher did like was to get an overview of reflections of all children to be able to identify strange or worrisome trends.

W.2.4 Storing the cards

The children receive separate cards, however teachers expected children will lose these cards. It is advised to make it possible to store all cards in a proper way, for example a folder.

W.2.5 Time

It was noticed by the teacher the children took too much time in colouring the clock to indicate the time in the evaluated concept proposal. Furthermore the children forgot how late they started the lesson, due to which the element of time was useless. The cards are improved by changing the clock into start and end time.

W.2.6 Involving the child

The teacher should involve the child in deciding what he prefers the teacher does with the information on the 'Humeur medaille' and how to use it to translate it into tasks. This involvement should be stimulated better and more to be able to address the different needs of children in different situations.

W.3 Implementation

The implementation is indicated as crucial for the success of the 'Humeur adviseur', therefore several recommendations were formulated.

W.3.1 Distribution

Within the evaluated concept proposal the children received the 'Humeur adviseur' from the EF and they gave it to their teacher. However not all teachers will be willing to use or understand the importance of use if a child gives the it to them. Therefore the concept is changed in which the teachers are firstly contacted before the child receives the 'Humeur

adviseur'. It is advice to further research the best way for distribution, especially since it was indicated that not all children will go the EF.

W.3.2 Implementation materials

Further development is needed for the materials which will be used within the implementation, such as the packaging, booklet for the child, folder for the teacher, website, and presentations. The materials should look inviting, ready to use, and clear. The materials should have short explanations, involve the child throughout the process, and create a safe environment for the child.

W.3.3 Name

The name is too difficult for children, it is advised to rename the 'Humeur adviseur'. Rhyming was liked.

W.3.4 Role of the parents

There is no specific role envisioned for the parents. It could be considered to give the parents a role within the 'Humeur adviseur'.

W.3.5 Business aspect

The costs are roughly estimated, but must be calculated in more detail. An owner and financier of the 'Humeur adviseur' should be found and a business model should be created. If this is arranged the production should be set up.

W.4 Technical detailing

The 'Humeur adviseur' is still a concept proposal and should be further developed before it can be produced. For the materialisation and production a recommendation is formulated.

W.4.1 Materials

The product can be made of PLA, which is a bio based plastic. It has a low density, high strength, and is easy to clean which makes it suitable for the product. However further research should be done into the material.

W.4.2 Production

Depending on the badge size the production technique can be chosen. For large amounts it is advised to use injection moulding. For smaller size, which is more likely, 3D printing is advised. More research should be done into the production.

W.5 Future research

The concept proposal is evaluated, however with a lot of limitations. Extra and more reliable research should be conducted within the targeted context and with the target group to validate the concept proposal and investigate the effects of the 'Humeur adviseur'. The following questions are important to answer:

W.5.1 Long term use

How would teachers and children experience the 'Humeur adviseur' over a longer period of time? Would the interaction change overtime? Do teacher learn to understand the child without the 'Gevoelens medaille'?

W.5.2 Feeling safe

Does the child feel safe enough to express himself honestly? What is the influence of the classmates on how the child expresses himself? Does the implementation help in creating a safe environment?

W.5.3 Effects

What is the effect of the 'Humeur adviseur' on the sick child, its school experience, and school performance? What is the effect on the classmates of using the 'Mijn les'-cards? Does the 'Humeur adviseur' supports the teacher enough to not over-/underestimate the child and feel confident and informed? What is the effect of the 'Humeur adviseur' on the social and personality (e.g. self-image and self-confidence) development of the sick child? Does the 'Humeur adviseur' support creating a new normalcy?

W.5.4 Different situations

In which situations is the 'Humeur adviseur' supportive? For which children is the 'Humeur adviseur' supportive? How do teachers use the 'Humeur adviseur'? Does the 'Humeur adviseur' fit in all school contexts?

W.5.5 Expressing

Is this way of expressing yourself suitable for all children with cancer? Are the correct moods visualised on the 'Gevoelens medaille'?

