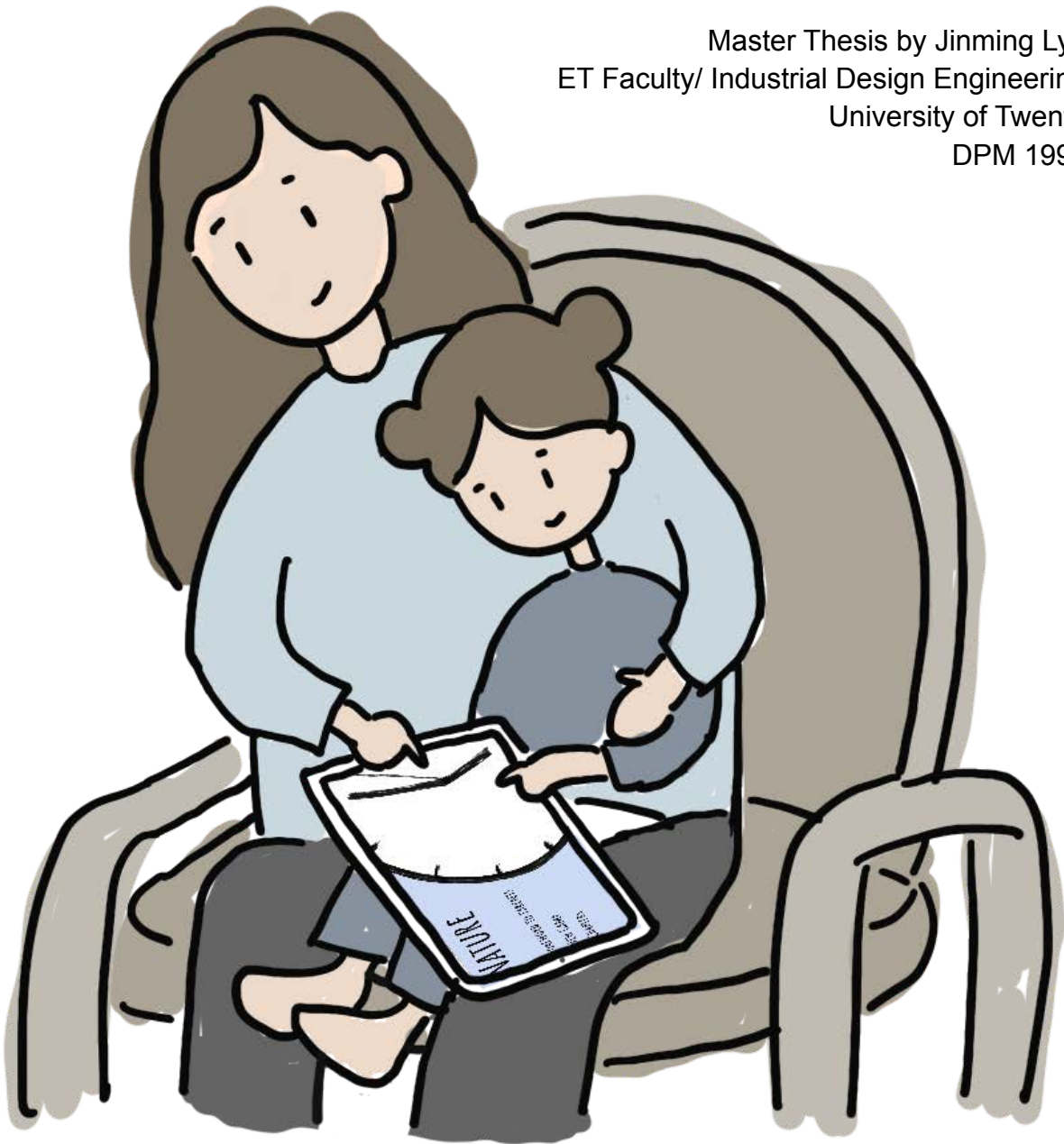# *Designing a Serious Game to Help Parents to Deliver of Death Education:*
Dilemma-driven-design as a Tool to Design for Users

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Abstract

Death education is a pedagogical journey that explores the relationship between life and death which encompasses views and attitudes towards death from different perspectives such as scientific, cultural and religious. Family-based death education for children will have a positive effect on children if it is conducted in a constructive way. Parents will see that their children's awareness of death and their ability to deal with grief both grow. Designers can be guided in transforming this abstract concept into practical entry points for design by using the dilemma-driven-design approach, which examines the dilemmas parents encounter when educating their children about death. This research thesis begins from an investigation of the context of death education and addresses the dilemmas based on the parents' personal experiences by designing and implementing a serious game. Additionally, this thesis discusses the potential for applying the dilemma-driven-design method and using serious games on abstract and extreme topics for the future work, including highlighting the needs and difficulties for design points, considering how people interact when having abstract conversations, limitations, and future improvement.

Keywords: Dilemma-driven-design, death education, children, design, serious game

Acknowledgement

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1.Introduction

In this chapter, the aim of the project and the approaches that are taken to research with aim will also be introduced in this chapter and explained in detail in the following chapters.

1.1.Scientific background

All people must deal with death at some point in their lives. Understanding and being intentionally exposed to the concept of death can lead to a greater comprehension of the meaning of life (George & Park, 2016). Additionally, understanding death can reduce anxiety about this suffering and ease the burden on the mind (Bagby, Parker & Taylor, 1994). However, in contemporary society there is a dearth of discussion about death, which is artificially avoided for social reasons, such as the taboo nature of the topic, religion and other influences (Doka, 2013).

Adults find it challenging to fully understand the complexity of dying. Children lack the life experiences and cognitive development that would allow them to adequately understand death (Poltorak & Glazer, 2006). Before children can comprehend death properly on an emotional level, they must first understand it intellectually.

Death education is a teaching journey that explores the relationship between life and death, that encompasses cultural and religious views and attitudes towards death and dying, with the hope that through the discussion of the subject of death, learners will come to appreciate life and appreciate it more (Wass,2004).

Death education has a very wide audience. Death education for children raises awareness of the topic, reduces the negative impact of emotional trauma on children, and helps them to value life and avoid violence and suicide (Bagby et al., 1994; Testoni, Biancalani, Ronconi & Varani, 2021).

1.2.The aim of the project

Given the context that death is a thing which is related to everyone and death education is necessary to be built up for children's health, a support is expected to be designed for parents to conduct the death education better because only by words parents find it difficult to explain the concept of death. The main goal of the project is to design a support to help parents who are experiencing problems in educating their children about death. From the broad topic of death education to practical steps, this project includes a literature review, user research phase and design phase. Separate goals will be set and once all the separate goals have been achieved the outcome of this project will be clear.

Literature review- For knowing the context
●   To get more information and insights on the importance and need of death education for children.
●   To learn about the ways to deliver death education.

User research- For knowing the needs of the participants
● To understand the dilemma parents face when they are willing to educate their children about death.
● To find out what parents think would be helpful when educating their children about death.
● To draw design inspiration from what the parents have done on death education.

Design phase- For designing a support
● To summarise good ways of providing death education and the needs of parents..
● To think about and design a support that will help address parents' dilemmas with death education.
● To evaluate the initial prototype with parents to see what features could be improved for better results.
● To optimise the design based on feedback from parents.

1.3.Research questions

In order to achieve the main goal of the project, the following research questions have been established:

RQ1. What is the importance of collaboratively exploring death education for the parents?

Because we hear the word 'death' so often, it is not an unfamiliar word to adults. But how is death perceived for children? Family-based death education conducted by the parents is an education that examines the perception of death for children. As part of education, death education is increasingly present in the world of parents. Parents will have a deeper understanding that death education is a crucial component of their children's development if they are aware of the significance of the topic.

RQ2. What are the dilemmas that have been identified by the participants?

By understanding the importance of death education, parents will know that they should indeed intervene and assist their children in their exploration of the cognitive process of death. In the process of educating children about death, many practical problems and dilemmas can arise that will overwhelm them. By targeting practical problems and dilemmas, solutions can be found.

RQ3. How can the intended support thing be designed to meet the identified stakeholders' needs and solve the dilemmas of the participants following from RQ1 and RQ2?

After understanding the stakeholder's dilemma and needs, what a designer needs to do is to design a support to help them solve the dilemmas as much as possible. Even if the problems are not fully solved, a workable solution can provide inspiration for future work, and those who come after can continue their research along this line.

RQ4. How and to what extent does the support design enable participants to collaboratively explore death education?

The aim of design is to solve problems, so the results need to be tested to see to what extent the problems have been solved. Hopefully, the potentials for solving the dilemmas from RQ2 will be generated by the whole design phase.

1.4. Research approach and structure

For answering RQ1, a thorough literature review made the background of the project clear and the result of RQ2 was also a complement to RQ1. For answering RQ2, interviews were conducted to address the dilemmas the participants had when they were facing death education. For answering RQ3 and RQ4, firstly inspiration was triggered by brainstorming sessions and in the end the most valuable idea was chosen and designed to be the initial prototype. Following the evaluation of the participants, the prototype was iterated to obtain better results to help participants provide death education for their children. The work done for answering RQ1,2,3 is based on the design methodology of dilemma-driven- design, which will be explained later.

As is shown in Figure 1.1, the research structure begins with literature review, followed by user research which will be done by interviews for participants. Based on the results of these two steps, a prototype has been designed from ideation to visualisation and the evaluation sessions were aiming to provide insights for iteration. After the second round of evaluation, the whole project is finalised with discussion and conclusion.
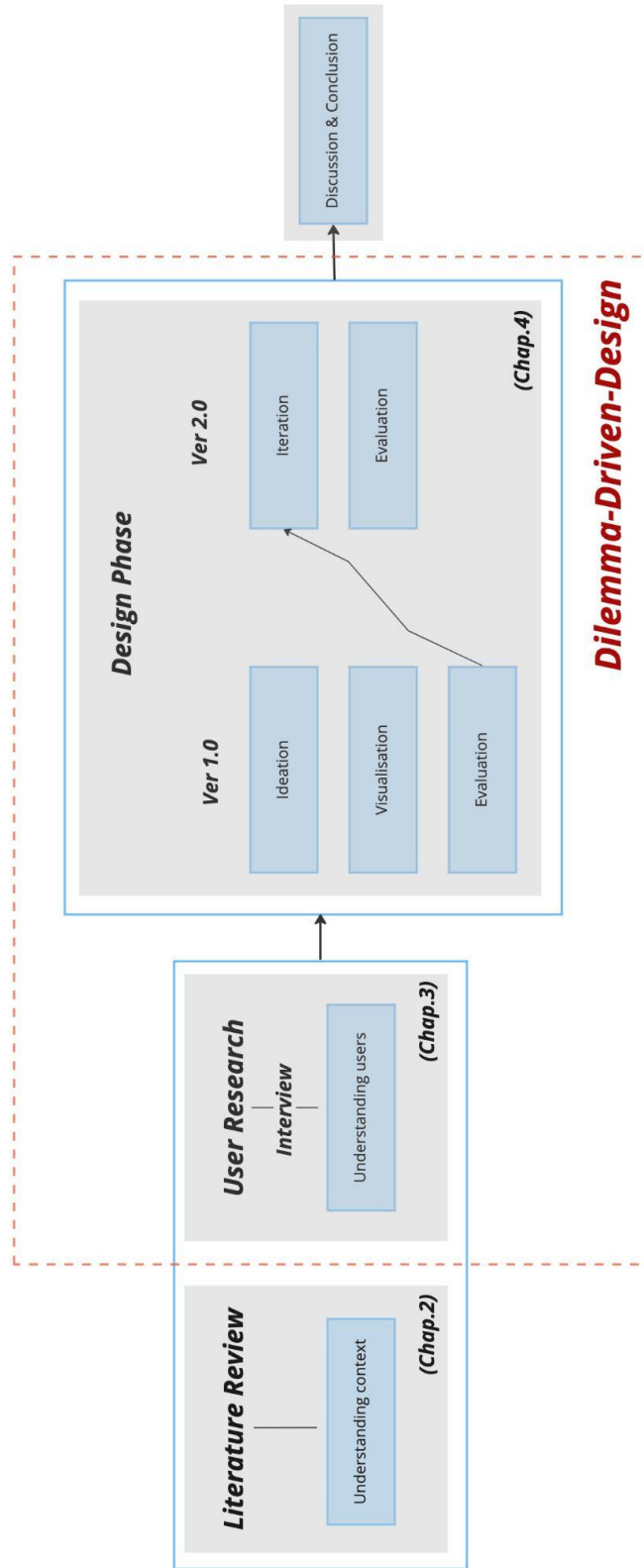
Figure 1.1. Research structure

2. Context of the research

This chapter will provide a comprehensive understanding of the context surrounding death education.
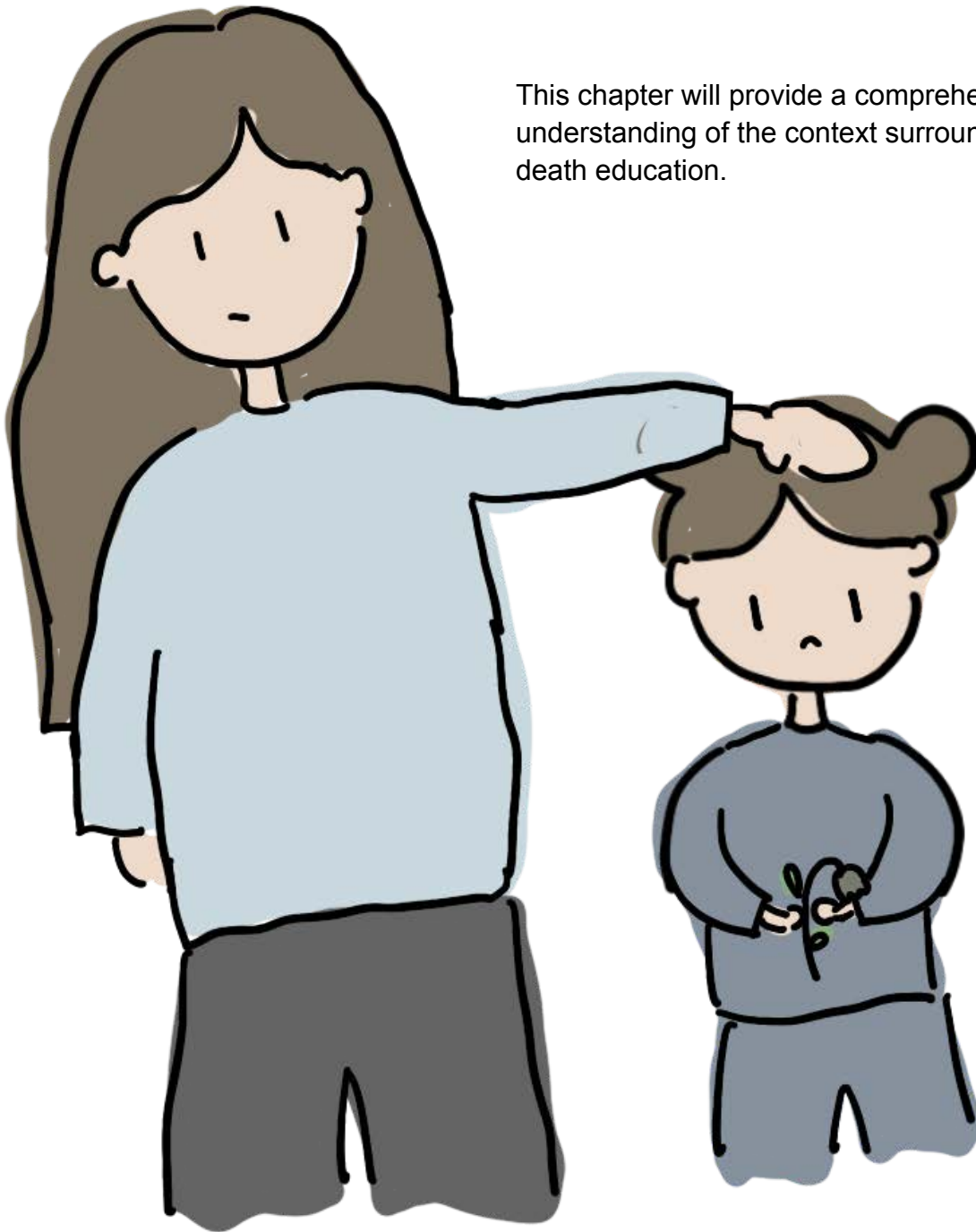
2.1.Understanding death education

Discussions of death are frequently avoided, and there is a lot of denial of death in contemporary society. (Doka, 2013; Greenberg, Pyszczynski, & Solomon, 1986). Several factors, such as social development, religion and public psychology, have contributed to this phenomenon. However, the contemporary tendency for death denial has many harmful effects. For instance, Bagby, Parker and Taylor noted that death-related thoughts and emotions may be suppressed as a result of death denial. In this way, the propensity for poor emotional experience and expression in words may cause other psychological problems (1994). Therefore, by starting a conversation about death and dying, it might be beneficial to consider existential concepts concerning worries about mortality (Testoni et al,. 2019). Death education is one approach for achieving the discussion goals and addressing the potential negative effects of not being able to talk about death.

Death education, as indicated by Wass (2004), means a variety of educational activities, intentionally organised by institutions in order to facilitate understandings of death and bereavement. Due to the general character of the subject of death, not all activities related to death education exist on an educational, academic or professional level. For example, the media, according to Noppe, is a platform where daily informal death education constantly appears (2007). The media, including television, publications and especially the internet, make it possible for the public to have a skewed perception of death through the use of unrealistic portrayals.

In order to give people a more correct perception of death, over many years, the researchers have studied and developed the topic of death education. In the 1960s, death was still a taboo topic (Templer, 1970). Considerable efforts have been expended to develop and refine death education programs since the 1960s (Wass, 2004). From the 1960s, professional pioneer Herman Feifel,as the first modern educator in a discussion of death education, encouraged experts in various fields, such as behavioural scientists, clinicians and humanists, to focus on and study the topic of death (1959). This gave the possibility to analyse the topic of the perception of death from a multidisciplinary perspective. By emphasising on the multidisciplinary nature of death studies, Feifel insisted that it is apparent that death education benefits all (including children), (Feifel, 1977). Formal death education has come a long way since the first conference on death education held at Hamline University in 1970 (Leviton, 1977). By encouraging patients to talk about their experiences in expressing their fear and hatred toward death, Kübler-Ross significantly contributed to the developing popularity of death awareness. The patients were able to move toward a condition of acceptance and calm as a result (1973). Numerous college- and university-level courses on philosophical and emotional topics have been developed in the field of death education since the

mid-1980s (Kellehear, 2015, p.214). Various instruments have been developed to assess the death attitude (Wong, Reker& Gesser, 1994). For example, the Collett-Lester fear of death scale was developed to help researchers to measure death anxiety that distinguished between the fear of death and the fear of dying and between fears for oneself and fears for others (Lester, 1994). In terms of application, a variety of activities for the public have been carried out in regards to death education. Crisis intervention programs have been offered for public school students, including attempts to implement longterm suicide prevention (Leenaars & Wenckstein, 1991, pp.173-176). The issue of death education for health professions is also of considerable concern, and more courses are being provided to health professionals who will likely engage with populations experiencing death and various sorts of loss(Dickinson, Sumner & Frederick, 1992). Besides, as a part of death education, Mallory suggested that a huge amount of clinical end of life education content should be added in the training of nurse students (2003). The development of death education reveals that it is a multidisciplinary field that covers a broad range of subject matter and an equally broad variety of application directions.

In the following sub-chapters, a closer look at death education will help to obtain a more rational basis for the aims of the project. In addition, the stakeholders of this project will be narrowed down to parents and children, rather than the public as a whole, who are the broad target audience for death education.

2.1.1.Different audiences of death education

Death is a universal reality and the subject of death is one that everyone can relate to. Managing dying,dead bodies and grief is predicted to be a major twenty-first century issue for individuals, for families, for social and health policies around the world (Walter, 2017, p.7). Therefore, all members of the public should consequently receive equal access to death education. However, due to the variety of circumstances, different audience groups require different approaches to death education. As a result, death education is frequently provided in distinct manners that is tailored to the characteristics of that group, depending on the age, environment, etc. of a particular group. Wass concluded that advancements have been seen in death education provided to a number of stakeholders by delivering different activities, including college students, the general public, primary- and secondary-level students, health professionals and grief counsellors, compared to the beginning days of thanatology (2004). Here, we discuss some typical stakeholder groups.

For health professionals
Death education for health professionals is not a new issue and has been concerned for two decades. Death education for health professionals is more complex than death

education in general because it requires the opportunity to grapple with the complexities of choice and decision affecting the lives of others in profound ways (Benoliel, 1982).

Benoliel suggested that death education be provided to health professionals so that they could be persuaded to comprehend the complex meanings of death as a factor or combination of factors impacting those who are engaged in clinical practice in order to provide an arena in which they could be urged to do so (1981). Besides, carrying out death education for health professionals is able to realise their anxiety which is related to the fear of their own death and promote personal death awareness (Popoff, 1975; Hurtig & Stewin, 1990).

Death education for health professionals is mainly aiming to train them to be able to focus on the affectual and experiential aspects of their patients and of themselves so that they can provide better services, actions and decisions for people that they will face in their workplace and meanwhile help themselves to eliminate their anxiety of death (Sinacore, 1981; Beloliel, 1982; Peters et al, 2013).

For patients

Death education is often combined with hospice care. Health professionals will apply the knowledge they have gained from death education on the patients, especially the dying ones to provide better service. Notably, Burgess, Beilby and Brooksbank (2004) pointed out that the own fear of death from the dying patients might cause the reluctance of some general practitioners to work for them.

Death education for the patients will help allay patients' fears and minimise pain and suffering when a terminal illness is diagnosed (Latimer, 1998). Death education should be initiated before the dying stage to help the patients reflect on the meanings of life and death based on the patients' needs (Zhan, Qiang, Zheng & Luo, 2018).

For children

Feifel admonished that death should also be part of children's cultural education since it is a reality (1977). However, children's voices are always missing in discussions of this context. Willis also stated that a largely unacknowledged group of vulnerable children existed regarding bereavement (2004).

The knowledge with children and death is mostly concerned with how children comprehend death and their understandings vary a lot according to their different experiences (Hunter & Smith, 2008; Christ, 2000). A limited understanding of children's relationship with death may contribute to a death-taboo by shaping practice around how adults engage with children (Paul, 2019). Death-taboo is phenomenon that Feifel

proposed as the denying and avoiding attitude toward death (1959) and it it means the belief that death is dangerous and disturbing so that one should not only avoid contact with the dead, the dying, and the recently bereaved but also refrain from talking or even thinking about it. Jackson and Colwell stated that death-taboo theory has been accepted and maintained, particularly in relation to children, in order to protect them by reducing their fear of death (2022). However, the acceptance of death-taboo theory does not recognise the individual agency of children in defining and redefining their own attitudes towards death.The children's individual agency is reflected as the majority of the children expressed a positive opinion toward the idea of introducing talk about death at an early age and voiced a need for additional information.(Paul, 2019).

Choosing a specific group for death education helps to identify problems in a more targeted way and to address them by design. Above we have analysed the different stakeholder groups and in this project we will focus primarily on death education for children.

The audience for death education is everyone. Death education for children introduces a correct concept of death to children in the early years of life. The typical audiences for death education discussed previously have grown up as children. Therefore, death education in the early years of a person's life (childhood) will play a positive role in the growth of the children and will guide them as they grow into adults in any profession, through different experiences, etc. Having chosen the children's group, we need to gain more insight and knowledge about children in this context in order to gain a better understanding of them and also the people who will provide death education.

2.1.2.Importance of death education for children

In general, people's awareness will rise as a result of learning how crucial death education is for children. Children will have a better understanding of death if the knowledge of death is explained to them in the right ways, which will be beneficial in many aspects.

Emotional and cognitive impact

Children who are going through normal developmental changes are under a great deal of stress due to the emotional and cognitive effects of death (Schramm, 1998). The stress will cause some physical and mental problems. For example, Glass (1991) demonstrated that children who struggle to comprehend death frequently display altered behaviour, such as sobbing, impatience, despondency, sleep difficulties, violence, or a decrease in attention span. Death education in good ways will help children to comprehend death and keep mental and physical health by relieving the stress.

Additionally, before we have discussed that death-related thoughts and emotions may be suppressed as a result of death denial. In the end, it could go forward as "alexithymia," the tendency toward impoverished emotional experience and language expressing feelings (Bagby et al., 1994), which is also a harmful mental problem. Death education in good ways will help children to comprehend death and keep mental and physical health by relieving the stress.

Dealing with sorrow

It is predicted that everyone has to deal with death at some points in life. As a more specific emotional feeling, grief is a normal emotion that can occur in relation to death. The long-term psychological impact of grief on children has a negative effect on many aspects, including adjustment to school, lifestyle, emotions, personality, relationships and values (Virk, Li, Lauritsen & Olsen, 2013).

Supporting children coping with grief, and more specifically, grief related to death by carrying out different death education activities will benefit them to mentally prepare (Heath et al,. 2008).

Suicide/violence prevention

Suicide is still a leading cause of death in children under 15 years old worldwide although it is a tragic event which is relatively rare (Apter, Bursztein, Bertolote, Fleischmann & Wasserman, 2009).

Death education for children offers a conceptual foundation to appreciate that a lifespan is limited and provides an opportunity for children to acquire and develop a mature sense of mortality and to learn that life must be cherished and protected including their own and others' (Testoni et al., 2021).

With the goal of developing children's awareness of death, death education will help them to accept the concept without feeling stressed. After understanding more about death, children will respect and protect life as they know a lifespan is finite. After recognising the importance of death education, we will talk about the various groups that can provide children with death education.

2.1.3. Death education for children in different environments

Schonfeld stated that children need caring and knowledgeable adults with whom they can discuss death, both in a general context before a loss and specifically in response to a significant death(1993).Most research indicates that parents and teachers support death education programs in theory (Barry, 2000). Here we will discuss death education

for children in school- and family-based environments, as these are the two environments in which children spend the most time.

School-based death education

Death has a presence in school, thus, by extension, the entire education community. Nature and humanity require that schools act as educational institutions and teachers serve as educators in a variety of circumstances, including when a student is affected by the death of a loved one, when death-related lessons are taught, when unusual events involving illness and death occur, such as natural disasters, terrorism, violence, and pandemics like the COVID-19 virus, or even just when a student asks a teacher a question about it (Rodríguez, Herrán, Pérez-Bonet & Sánchez-Huete, 2021).

However, the situation in general is not positive. The perspectives of interventions in mourning circumstances among teachers were examined by Dyregrov, Dyregrov & Idsoe using a variety of methodologies. 90% of respondents agreed that the tutor played a crucial role in educational counselling, but they did not have the training necessary to handle these circumstances (2013). Furthermore, it is incredibly obvious that preparation for school organisations and coordination among educational players is out of lack (Hinton & Kirk, 2015).

Even though it is a topic that is almost totally absent from training, educators have a positive attitude toward the inclusion of death education in the curriculum and preparation for bereavement and also in other circumstances that call for educational help in contexts of loss (Rodríguez et al., 2021)

Family-based death education

Death education can happen in both school and home but grief is a family affair (Breen et al., 2019) as the family is one of the most significant contexts in which grieving may occur. Thus, we will focus more on death education in a family context. Death happens at various times in a family's development as well as at various stages in a family member's development (Breen et al., 2019) even before children realise. Therefore, family members should take actions for educating children about death as the environment where grief occurs together with death.

The complexity of the school setting, both in terms of the number of children and the variety of situations, necessitates that educators receive professional training in children's death education. Conversely, the family, as a smaller unit, is more likely to implement death education for children. Meanwhile, the family is more relevant for educating children about death because death is typically centred on the family.

Death education has been discussed above, including the concept, development, stakeholders and importance. In this project, we mainly focus on the death education for children conducted by parents and we then need to learn more about this particular group.

2.2. Understanding the children in the topic of death education

To help the parents deliver death education for their children in a more useful and considerate way, we should firstly get to know the children's perspective and what challenges the parents are facing.

2.2.1. Children's development of death concept

It was previously thought that children couldn't understand death and even if they could, talking to them about it would be very harmful. Because of this, clinicians and parents frequently stay well clear of talking about mortality with children, even when those children are actually suffering from significant illnesses. However, it has come to be recognized that young children do in fact have significant concepts of death, and that these concepts alter as they mature. Children's awareness of disease and death is closely related to their cognitive and psychological growth (Poltorak & Glazer, 2006).

The cognitive development theory of Jean Piaget (1929) has given us a vocabulary to characterise the qualitative variations in children's perception of death at different developmental levels. Children progress through four sequential stages of cognitive development as a result of biological maturation and the accumulation of experience: (1) the sensorimotor stage (infancy, birth through about age 2), (2) the preoperational stage (early childhood, approximately ages 2 through 7), (3) the concrete operational stage (middle to late childhood, approximately ages 7 through 11), and (4) the formal operational stage (adolescence through adulthood). Psychologist Maria Nagy, also called "Auntie Death", also found a correlation between children's age and their understanding of death by learning through interviews and pictures drawn by almost 400 Hungarian children aged three to ten (1948).

Stage 1- sensorimotor stage (infancy, birth through approximately age 2)
The sensorimotor child primarily uses their senses and their movement to interact with their environment. Children at this developmental period don't seem to have a concept of death as such; they are unable to cognitively discern between separation and death.

Stage 2-preoperational stage (early childhood, roughly ages 2 through 7)
Children believed that death involved a continuation of life, but at a reduced level of activity and experiences which means children tend to deny that death is the end of a

person's life. Children see the dead as sleeping and believe that the deceased is only going on a journey and will return to the world of the living. At this stage, the children concern the fear of separation and not necessarily the fear of dying or being dead.

Stage 3- concrete operational stage (middle to late childhood, roughly ages 7 through 11

Children progress to understand that death is the end of life and it is irreversible. However, they also believe that if they are clever enough they can cheat death and avoid it. For children, death takes on concrete imagery like the skeletons and this personification of death concept makes the children have the belief to outrun the skeletons. Thus, universality in death is a concept yet to be achieved.

Stage 4- formal operational stage (adolescence through adulthood)

Children have a more mature concept that death cannot be avoided, that everyone dies at some point, and that they themselves are no exception. Concepts of death further develop as youngsters go from informal operational thought to formal operational thought and as thinking eventually becomes more abstract. However, it's possible that even older teenagers' concept of mortality is still less clear-cut and sophisticated than that of adults.

Knowing the information about the development of the concept of death for children ought to prevent parents from making rigid assumptions based strictly on chronological age. Instead, it's crucial to comprehend a child's unique degree of cognitive and emotional knowledge in order to recognize any misunderstandings or worries that might be present.

It is also true that age alone as a determining factor (also the level of cognitive ability based on ages) when it comes to the concept of death is too simple an approach. Children who have witnessed violent or traumatic deaths, experienced the loss of a parent, or who are now dying will recognize death far earlier than children who have not had these experiences (Bluebond-Langner, 1997). In this project, we will only talk about the children who grow up without too extreme situations.

2.2.2. Better explanation to be used in death education for children

With the children's development of death concept, we can see that for the children on preoperational stage and concrete operational stage, one goal of death education is to tell them that death is the end of life and it is irreversible and universal. There are different ways of explaining death based on distinct perspectives like philosophy, religions and so on. For instance, Wu (2022)discusses death education from an Hegelian perspective and it starts from a natural view that death is a natural

phenomenon to an ontological view. Explanations on a philosophical level can lead to a lot of thinking, but are not suitable for a children's comprehension. There are also religious ways to explain death. However, concerns from the parents were expressed regarding teachers' philosophical and religious values about death being conveyed to their children (Crase & Crase, 1982). The better explanation is to teach children through a scientific way which tells the truth of death that death is the end of life and it is irreversible without complicated philosophical and religious values.

3.User research

This chapter explains the user research in detail and the result will be the guidance of the design phase.
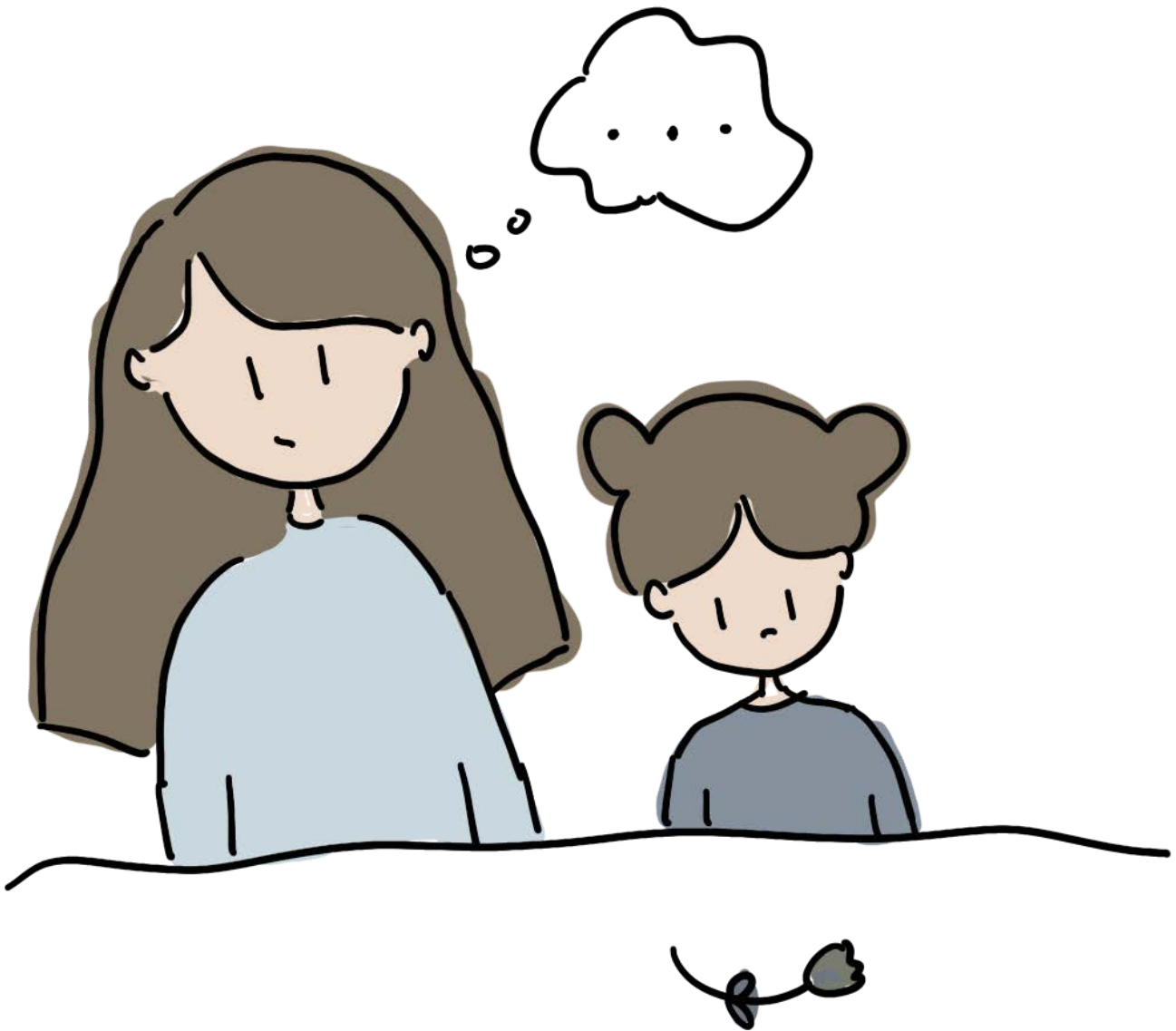
In this chapter, parents who are interested in death education for their children are interviewed as part of user research that focuses on family-based death education. The interviews primarily centre on the challenges they have when trying to have conversations with their children about death and what they expect to accomplish with death education. The dilemma-driven design (DDD) approach rephrases the difficulties to generate the key problems. Moreover, the experiences that were relevant to the topic were all very valuable.

3.1. Interview

We need to learn more about the perspectives that parents have in order to understand how they perceive death education. We made the decision to conduct interviews during this research journey to get more information from the parents. Due to the intense and challenging character of this topic, a questionnaire was initially chosen as one method of doing user research. This allowed parents to complete the questionnaire without being disturbed or experiencing too many emotional fluctuations. A questionnaire, however, will mostly include some quantitative inquiries. A person-to-person interview is considered to be preferable for establishing a stronger connection and increasing the chances of sparking additional ideas.

3.1.1. Interview questions

The purpose of conducting all of the interviews is to learn about their expectations on how to perform death education more effectively as well as their experiences providing death education to their children, if they have already done so. The interview contents vary from different parents based on their own answers but in general, before the interviews, a list of questions are prepared for the whole interview structure:

1- What is death education
Do you know about death education?
How do you feel about death education for children?
Do you see it as a more positive thing or something you don't want to touch yet?

2- How to deliver death education
Are you willing to conduct death education to your children?
Did you ever try to talk about death with your children? (Where, in what occasion)
If you already did, do you feel you chose a good way? Why? How would you like to improve that if possible?
In what way did you do that or do you prefer doing that?
Did you try to use anything to explain death to your children? (Media, products, things…)

Did you see any good ways of conducting death education?
What did you do besides just talking?

3- Connection between parents and children
Did you pay attention to the children's reactions?
How did you interact with each other?
What did/will you do if the children are sad?

4- Difficulties and expectations
Do you find it difficult to talk about death with children?
What are the difficulties of talking about death with children?
What dilemmas have you experienced when talking about death?
What will be the ideal situation in your mind when talking about death with children?

3.1.2. Interview structure

Before the interviews even began, parents had a general idea of the interview's background. To ensure a smooth start, I usually started by giving a brief overview of the project and reminding them once more that because it would be an extreme subject, talking about it would not be easy, but they might feel free to stop as stated in the consent letter.

The interviews were started by asking the first question; however, not every participant was questioned in full by all the questions listed above. Individual differences in the content were significant.

The interviews were closed with a brief conversation in which we discussed the project once more in general after hearing about the participants' attitudes, experiences, and stories. Almost all of the participants expressed a strong interest in the final design and expressed a desire to try it out in the end and this will be thoroughly detailed during the evaluation session.

The interviews were all person-to-person and lasted for around 1 hour.

3.1.3. Participants overview

In total there were five groups of parents participating in this project and Table 3.1 provides an overview of the participants. The table contains no personally identifiable information, and all of the information has the participants' approval.

Table 3.1. Participants overview

Participant group No.	Participant No.	Children	Note
1	1	1 boy (5 y/o) 1 girl (7 y/o)	Couple, interviewed together
	2		
2	3	1 boy (13 y/o) 1 boy (8 y/o)	
3	4	Planning	Couple, interviewed together
	5		
4	6	1 girl (6 y/o)	
5	7	1 boy (7 y/o) 1 girl (3 y/o)	

Not all the participants are experienced and some are not even parents yet. Also, not all the children are on the preoperational stage and concrete operational stage but death education will not just happen on the preoperational stage and concrete operational stage. Therefore, all the insight from the parents will be valuable and they can provide any ideas on death education based on their own understanding.

3.1.4. Interview summary

Five group participants shared their experiences, stories and thoughts. All interviews have been recorded for further summarisation and analysis. The parents have experienced the exploration of death education for their children differently. In order to determine whether there are any common issues or requirements when parents conduct or desire to perform death education for their children, all interview findings will be combined firstly to analyse. There was a wealth of information in the results of the interviews for each group of participants. This information was analysed by combining similar expressions when it was observed that all five or multiple groups of participants mentioned similar expressions, and then the concluding statements behind these expressions were a summary of the participants' shared thoughts. For example, all the group's participants shared their willingness toward death education in different ways. Some participants didn't get enough death education when they were young and they would like to change the situation for their children. Besides, some participants see it important to conduct death education. When all the above information is put together, we can see the attitude is generally positive.

In the interview summary chapter, a total of 16 findings are presented to demonstrate the participants' views on the education of their children about death.

Parents' attitude toward death education is positive

All the participants showed a positive attitude toward death education for different reasons. Some participants got this attitude because of their own childhood experiences as [P2] said "My parents didn't really talk about death when I was young and I don't think that's a good thing because sometimes I don't understand it. I hope my children can understand." Participants also shared the positive effects they thought that death education would bring. [P4] talked about the positive effects from a very huge perspective as "...that's also helpful for the children to know what life means..." and [P5] added "... then they will know that they should cherish their lives...".

Most parents see death education as part of family education

Educators take important roles in educating children about death and this should also be considered as "...part of school security education...children also learn to treat other lives well..."[P7]. However, death education is also very significant at home from the participants' perspectives. Family-based environment is safe for the children so the connection between children and parents should be a natural strength that family-based education has. [P1] and [P2] preferred family-based death education as they believed that parents are the ones who know more about their children and based on this, better death education activities can be carried out. [P5] was not sure about really doing it and he also added "... but that's probably because we haven't been put into a real context yet...".

Parents normally don't start conversations randomly

Death is a "vague concept" ([P1]) actually and it is difficult to directly start a discussion. It will be too random and confusing for the children. "It is a good way to find something outside like how the plants change by seasons... ", [P2] provided a good way of opening the conversations. [P3] mentioned a time when she watched an animation film named *Inside Out* with her sons. "... my son asked what would happen when a boy named *Bing Bong* left...but actually he wanted to sacrifice for the girl because only one person could be alive... and that was a very unexpected timing for me to start a conversation and I used the names in the film... my children can refer to the personas in the film and it is easier for me to explain." (*Bing Bong* is the friend of the girl.) [P4] and [P5] also have the feeling that only by talking and words, it won't help too much for the children to understand death. "... all the things in our lives can trigger conversations and we need to observe when we want to start this topic. ", [P4] gave some examples like "the death of pets, the falling of flowers and even maybe the stars…" and she explains that "stars

can be dead one day as well… I mean we can refer to many things which we see in our world...”.

Stay calm

While having the discussion about death with the children, parents should stay calm and try to avoid any obvious emotional changes. Children are very sensitive and can easily detect changes in their parents' moods and at the same time, changes in their parents' moods can affect their children's moods. [P6] once was touched by the plot of a film which was about a bear who couldn't be together with parents anymore. Her daughter looked at her and got closer with her on the couch. She could feel that her emotional change affected her daughter. When talking about such a serious topic, it is important for the parents to stay calm so that the children won't be too affected.

Different tools will be helpful

[P1] and [P2] showed a children's book (*Kikker en het vogeltje,* translated as *The Frog and the Bird*) which was related to death. (*Kikker en het vogeltje* tells a story about a frog who found a dead bird but didn't understand what happened. The frog went to find some other friends and they talked about the death of the bird and decided to bury the bird in the end. After that, they felt sad for a while. The frog suggested playing some games and all the friends had fun together and knew the feeling of cherishing their lives.) They read the book together to their children and they could see that the children understood the story. [P1] also mentioned her own childhood experience that her family tried to explain what death was to her by reading the *rouwkaart*(bereavement card in Dutch) of her grandma and that made “... death became more figurable... ”. Besides, many participants mentioned films as another way to help children understand death[P3, P5, P6 & P7].

Explanation of wording should not be too subtle

Two groups of participants had the same problem once. [P1] and [P2] shared a story that the bunny died and they just accidentally said the bunny went to a beautiful place but their son kept asking where the beautiful place was. Afterwards they talked about it and did not feel the “... beautiful words helped...”. Also, [P3] mentioned that she felt that “heaven” might be a concept which makes the children confused. “Actually I'm not religious but when it comes to this topic, it is so natural to borrow some words like 'heaven'. However, it should be cautious to use those words.” [P7] pointed out that a scientific explanation is important and that's how he wants his children to think about death. He also added that “... but should be too difficult or professional. A more childlike scientific way would be good...”.

Parents should not be too serious when talking

For children to learn and develop, small steps or some interesting activities would be more appealing. [P6] related an experience in which she tried to explain how an elephant died in a documentary in an overly serious way, and she could tell that her daughter was confused by the explanation. [P7] explained more about the childlike scientific way by using the film example. "...the films for children sometimes are also about very serious topics but normally those films are animation or cartoon style which will decrease the difficulties." However, it is also important to remind the children it is a serious thing.

Showing the real truth to the children directly might not help

[P3] had an experience where she decided to video call her son when her mom passed away and she wanted her son "...to participate in that occasion...", and she felt regretful for this behaviour because she felt that it was "too real" for her son to see it directly. Additionally, [P4] and [P5] stated that they would not use the death of people as the way to explain death in the beginning besides "... something really happens and we have no choices but I prefer doing it via some not-real situations...".

Parents should not avoid using the word of death

Sometimes parents try to hide the truth by using some replaceable words like "... gone, disappeared…" ([P2]& [P7]) but this "... causes problems as we still need to explain the other words and the connection between those words and 'death'..." ([P2]).

Parents should always behave positively and optimistically

Parents have more life experiences as adults and with more experiences adults have less fear of separation. [P6] could understand that "it is normal that we have to say goodbye one day but for children it is something they haven't gone through yet..." and she expressed that "... we still need to encourage them that life is still continuing and you should still be more positive...".

Pay attention to children's fearness

In this context, there can be many reasons for children's fearness. Children are afraid of feeling sad especially when they already felt that, and they will try to avoid the same sad feeling. [P6] noticed this because her daughter did not want to watch the documentary about the death of the elephant a second time. Also, many parents have heard questions from their children like "will I die?" ([P1] & [P2]) or "will you die?". This implies that the children are afraid of the death and the dying of themselves and others. Dealing with children's fearness is also an important part of death education so firstly parents should be very cautious when paying attention to children's fearness. "Sympathy is very

important... " ([P4]) during the whole process and the parents should try their best to understand how children feel.

Make sure the children feel safe

Death could be a scary thing for children if death education is lacking or conducted in a wrong way. Family-based death education has its advantage that the environment is very familiar for the children and a safe environment will be more relaxed for the children. [P1] and [P2] normally read the children's books for their children before they sleep. They know that their children also enjoy the cosy atmosphere where they stay and lie on the bed together. The children don't feel stressed or nervous and they can talk about everything they want. Additionally, as this topic itself is very extreme, almost all the participants mentioned that the way of carrying out death education should be children-friendly.

Be prepared for questions from the children

Children will not absolutely understand death because "...as adults we even don't understand it 100%... "(P2). Children have many questions when they are confused with this topic and some are very unexpected. When [P1] and [P2] read *Kikker en het vogeltje* to their children, the children asked many questions. [P1] and [P2] did not remember what the questions were but they could still address their feelings. "I feel they are very interested in this topic. Maybe that's because we have other *Kikker* books at home as well so my children are very familiar with the frog. Lots of questions popped up and we were not prepared well as sometimes." ([P1])

Be supportive of all the thoughts from children

Sometimes children have many unpredictable thoughts and all the exploration is valuable. This means they are very interested in this topic and want to know more. Parents should always be supportive of all the thoughts besides just answering questions. For instance, [P1] and [P2] had the experience that their children wanted to read the children's book related to death themselves. They were still staying with the children but just listening. That also gave the children initiative to explore this topic.

Termination

Parents should stop the activities of doing death education and reassure the child if they notice a significant change in mood, or if they feel nervous or overly upset. [P6] once stopped playing the video which made her daughter too sad and hugged her to calm her down. From telling the knowledge to children to decide when to end the activities, parents are taking the initiative during all the process.

Always making the children feel loved

When someone is feeling sad, it is common for people to offer love and comfort through physical gestures such as hugs ([P4]). It is necessary to interact with the children while conducting death education and all the interactions will make the children feel the companionship. Children feel sad when touching this subject and sadness is one of the significant emotions. Feeling sad is not a negative thing but a nice "... simulation for the children to know how and grief is... ", according to [P4] and [P5], "... and what we need to do is to tell them we will always be there for them and we love them… ". Other participants also mentioned "love" multiple times in this context. For example, [P1] and [P2] observed that their children were sad by the story (*Kikker en vogeltje*) and they kept telling the children that "we love you" in the end and that's very natural interaction.

3.1.5.Interview analysis

More interview analysis is done in order to obtain remarkably enlightening information. In the interview summary chapter, all sixteen findings can be sorted and categorised by the time before and during the death education activities were carried out (see in Figure 3.1). Reflection after conducting a death education activity was not mentioned in detail during the interviews, but any thoughts on the topic can be used as an afterthought reflection.

Before doing death education activity	During doing death education activity		After doing death education activity
Positive attitude	Don't start randomly	Not avoid the word of death	Reflection
A part of family education	Explanation should not be subtle	Showing the truth might not help	
Stay calm	Should not be too serious	Be prepared for questions	
Different tools	Pay attention to children	Behave positively	
	Make sure children feel safe	Make the children feel loved	
	Be supportive	Termination	

Figure 3.1.Timeline of all the sixteen findings

In the previous literature review chapter, we learnt that death education is important and for children, death education aims at teaching the knowledge of death and helping children deal with emotions. Together with the literature review results in chapter 1, the results of literature review and interviews were structured toward death education as three sequential stages : (1) preparation stage (before doing death education activity); (2) operation stage (during doing death education activity); (3) reflection stage (after doing death education activity). The three stages are explained in detailed below:

Preparation stage

At this stage, parents are able to recognise the value of educating their children about death and are willing and ready to do so themselves. After considering the form of death education, they need and are able to pick an appropriate and practical tool (the tool can be in any form. For example, it can be an object that exists in nature, or a medium such as a children's picture book, a film, or some design product.). At the same time, parents should be able to control their own emotions and avoid too much emotional turmoil.

Operation stage

At this stage, parents can now start working on death education after more comprehensive preparation. In a safe environment, death education can be carried out. They will first explain to the children about death, which will help them to comprehend death. During this process, parents should always keep an eye out for the child's emotional changes and make a reasonable decision as to whether to stop death education or continue.

Reflection stage

Children should be educated about death throughout their lives; it is not a one-time experience. Parents should reflect after making a concerted attempt to educate children about death. During this reflection stage, parents are able to reflect on their own behaviour and to do so in a better way the following time they educate their children about death.

Figure 3.2 illustrates the progress of the three sequential stages based on the interview information. Text in yellow rectangles is the significant results from literature review and text in green rectangles is the conclusions of different findings (in blue rectangles) from the results of interviews.

Reflection stage

To do it in a better way

Reflection

Operation stage

Telling the knowledge about death

Don't start randomly

Not avoid the word of death

Explanation should not be subtle

Showing the truth might not help

Should not be too serious

Be prepared for questions

Dealing with the children's emotions

Make sure children feel safe

Be supportive

Make the children feel loved

Behave positively

Observing children's behaviour

Pay attention to children

Termination

By using the tool

Preparation stage

Knowing the importance of Death Education

+

Mentally prepared for doing Death Education

Positive attitude

A part of family education

Stay calm

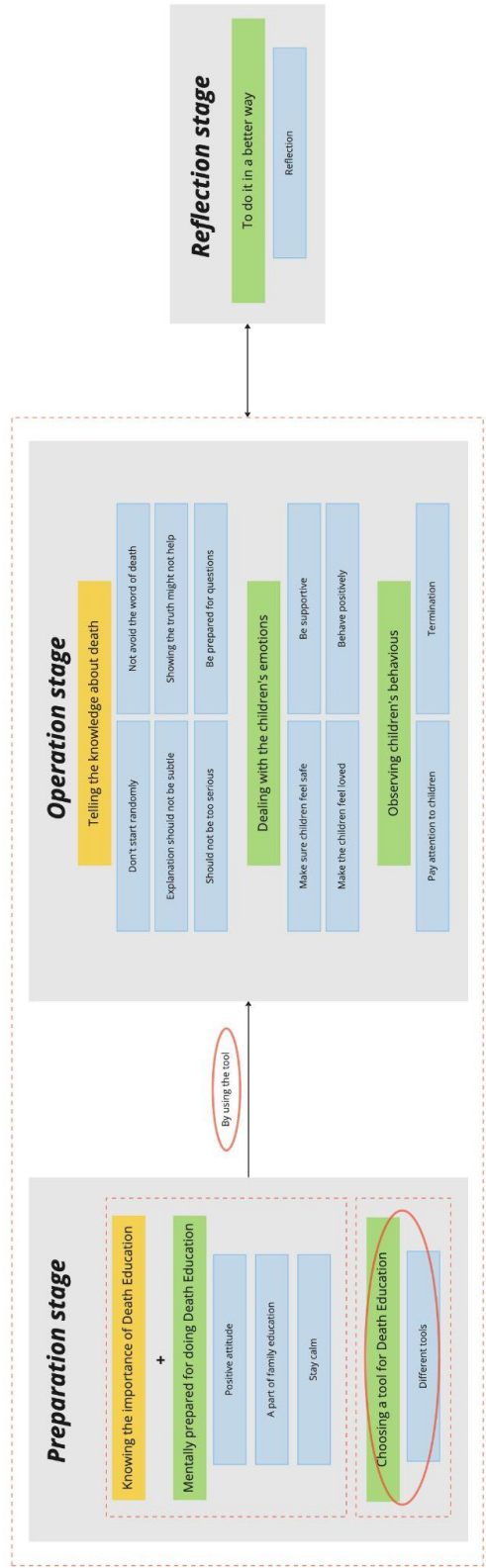**Choosing a tool for Death Education**

Different tools

Figure 3.2. The progress of death education

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3.2.Define design problems

We have gained lots of insights from the participants and many of the needs are classified and defined. There are some conflicting thoughts that bother the parents. For example, parents experience their own emotional changes while taking care of their children so that the balance between taking care of themselves and children can be difficult to achieve. Besides, in the insights, the explanation words are often containing opposite elements, like "scientific explanation" vs "ambiguous beautiful words".

To highlight all the conflicting elements, the information from the participants still needs to be rephrased. The conflicting elements are seen as a rich source of creativity because they can inspire fresh ideas to resolve incompatible demands and restore equilibrium (Benack, Basseches & Swan, 1989). Thus, dilemma-driven design (DDD), as a conflict-inspired design approach, will be introduced here.

3.2.1.Dilemma-driven design

Dilemmas can be defined as the realisation that one cannot have two desirable alternatives at the same time (Ozkaramanli, Desmet & Özcan, 2018). Ozkaramanli, Desmet and Özcan identified three main activities in the whole DDD, namely 'discovery', 'definition', and 'application'. Figure 3.3 illustrates these stages.
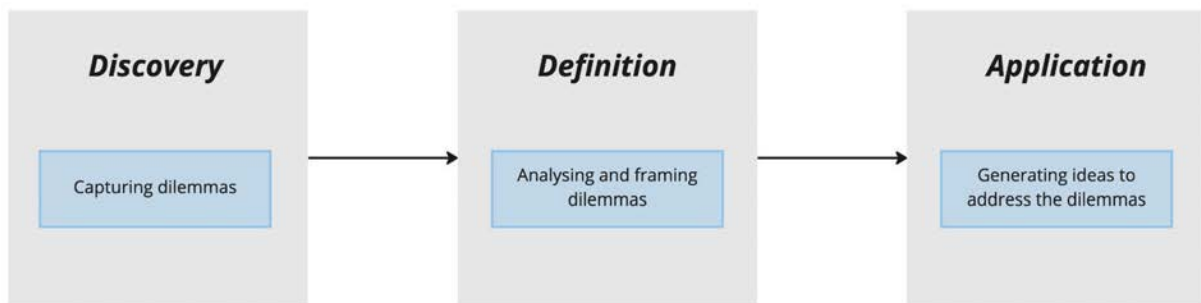

Figure 3.3. The three main activities in DDD

Each activity's output serves as the subsequent activity's input in DDD. A dilemma can be framed as Figure 3.4.
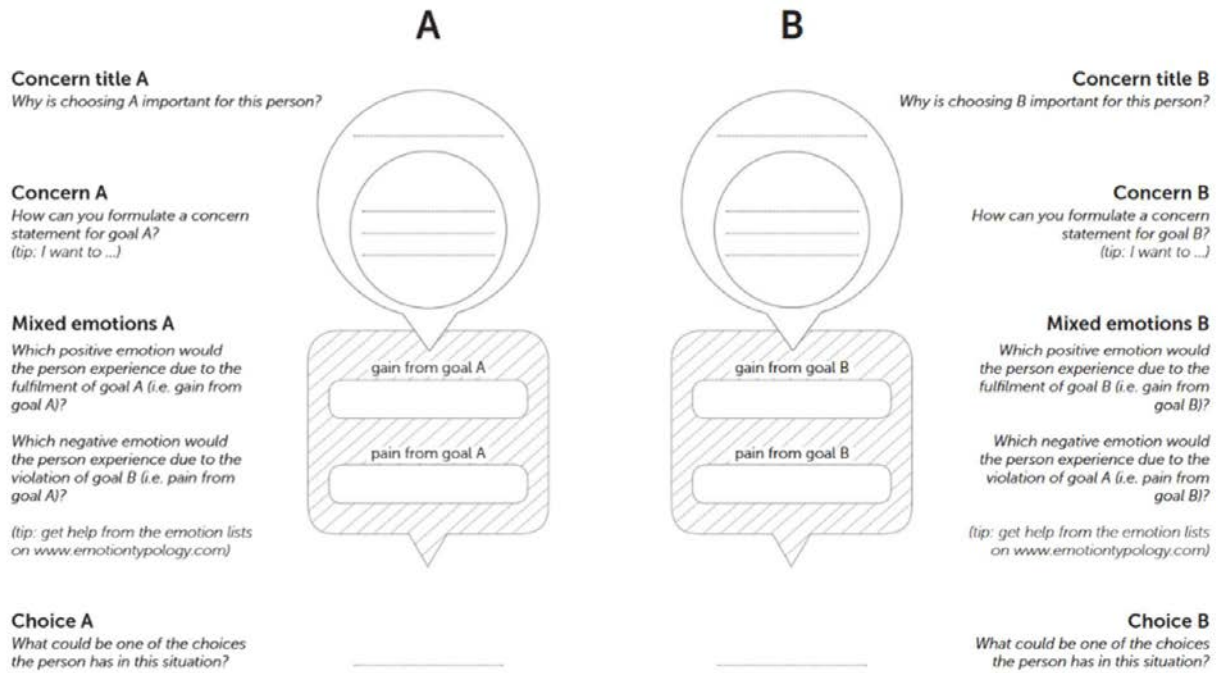
A　　　　　　　　**B**

Concern title A
Why is choosing A important for this person?

Concern A
How can you formulate a concern statement for goal A? (tip: I want to ...)

Mixed emotions A
Which positive emotion would the person experience due to the fulfilment of goal A (i.e. gain from goal A)?

Which negative emotion would the person experience due to the violation of goal B (i.e. pain from goal A)?

(tip: get help from the emotion lists on www.emotiontypology.com)

Choice A
What could be one of the choices the person has in this situation?

gain from goal A

pain from goal A

gain from goal B

pain from goal B

Concern title B
Why is choosing B important for this person?

Concern B
How can you formulate a concern statement for goal B? (tip: I want to ...)

Mixed emotions B
Which positive emotion would the person experience due to the fulfilment of goal B (i.e. gain from goal B)?

Which negative emotion would the person experience due to the violation of goal A (i.e. pain from goal B)?

(tip: get help from the emotion lists on www.emotiontypology.com)

Choice B
What could be one of the choices the person has in this situation?

Figure 3.4. Framework of the dilemmas in DDD

3.2.2.Dilemmas

We address the dilemmas faced by the parents as revealed by the interview's findings by using the framework shown in Figure 3.5.
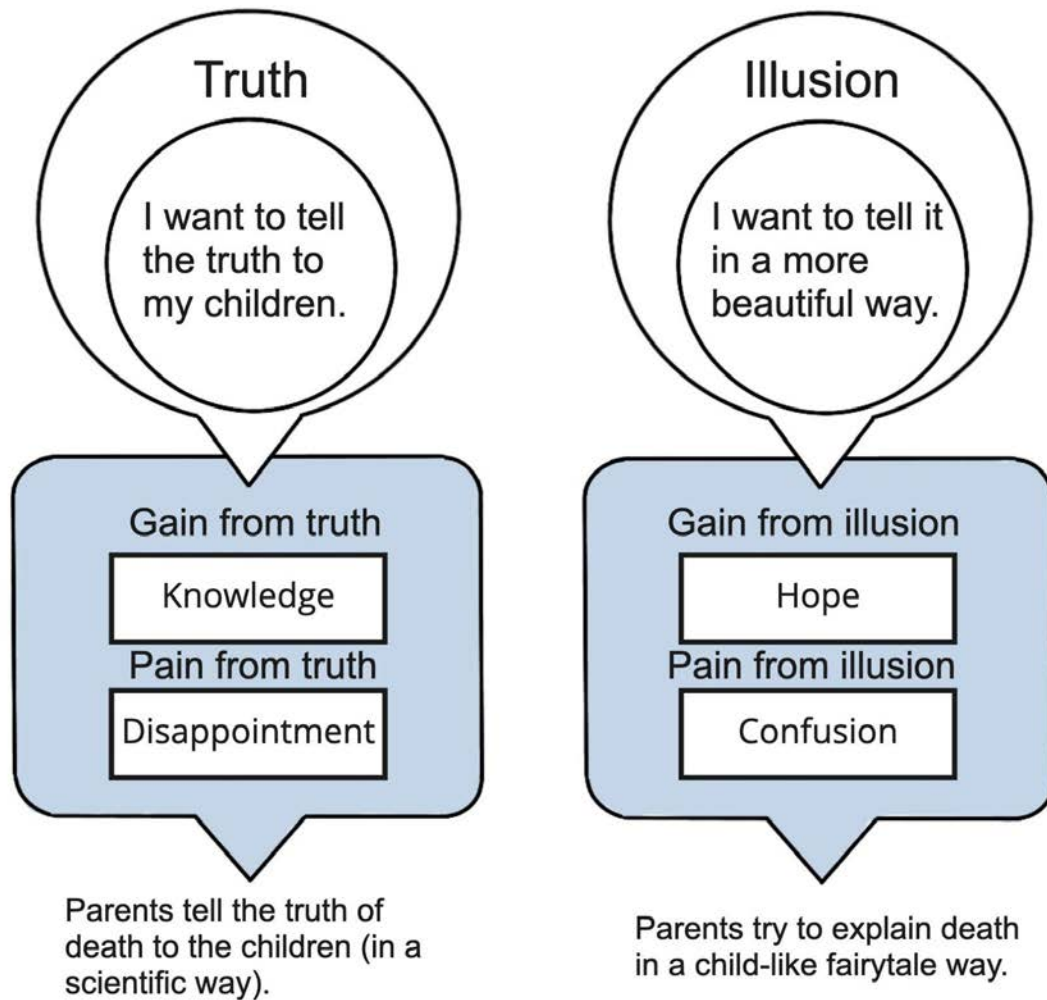
Dilemmas of the way of explaining death

Figure 3.5. Framework of dilemmas, illustrating the conflicts between the truth and the illusion

All the reflections are based on the way of explaining death to children. As shown in Figure 3.5, parents want to tell the truth of death to the children so that the children can have a more scientific perspective toward death. However, children might feel disappointed by knowing that death is the end of life and it is irreversible. If parents do it in another way which allows a more beautiful explanation which is like a fairytale, children will get more hope from it but this imagination also brings confusion which is not helpful.

Design problem toward these dilemmas: What kind of a tool can be designed to make the definition of death clear while maintaining a linguistic childlike innocence?
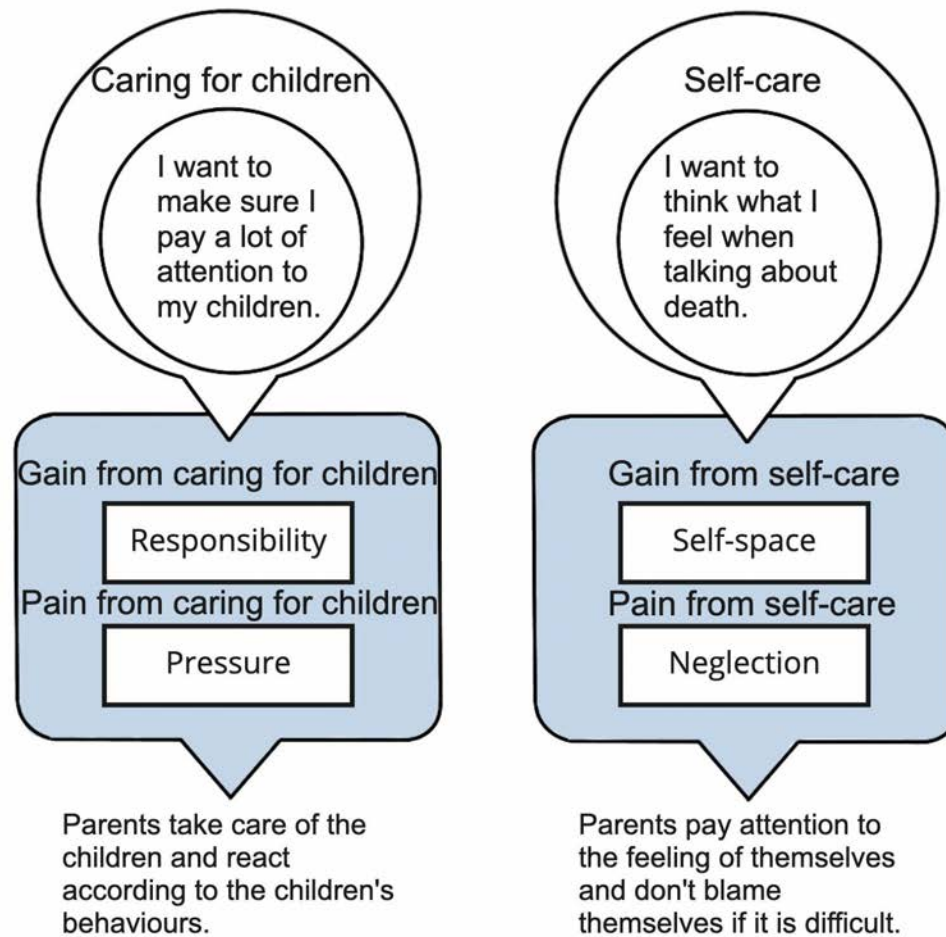
Dilemmas of focus of attention

Figure 3.6. Framework of dilemmas, illustrating the conflicts between caring for children and self-care

Figure 3.6 states the difficult balance between caring for the children and self-care. There is no wonder that parents always put children's needs first as the most important thing, especially in such an extreme topic. Parents will pay a lot of attention to their children and lose the focus on their own. This topic is also highly relevant to every parent so sometimes they can also be emotional. Therefore, at those emotional moments, parents listen to themselves to get some self-reflections. The tricky balance not only appears on this topic. To some extent, parents are not just being themselves after having children.

Design problem toward these dilemmas: What kind of a tool can be designed to take into account the feelings of both parents and children?

Dilemmas of when and where to conduct death education

Casualness

I want to explain it naturally when I see any clues which I have seen in daily life.

Preparation

I want to talk about it in a quiet and pure environment without any interference.

Gain from casualness

Interests

Pain from casualness

Unknownness

Gain from preparation

Confidence

Pain from preparation

Rigidity

Parent acknowledge that they need to quote examples from daily life correctly.

Parent prepare a timing when they decide to have the conversation and do it in a safe environment.
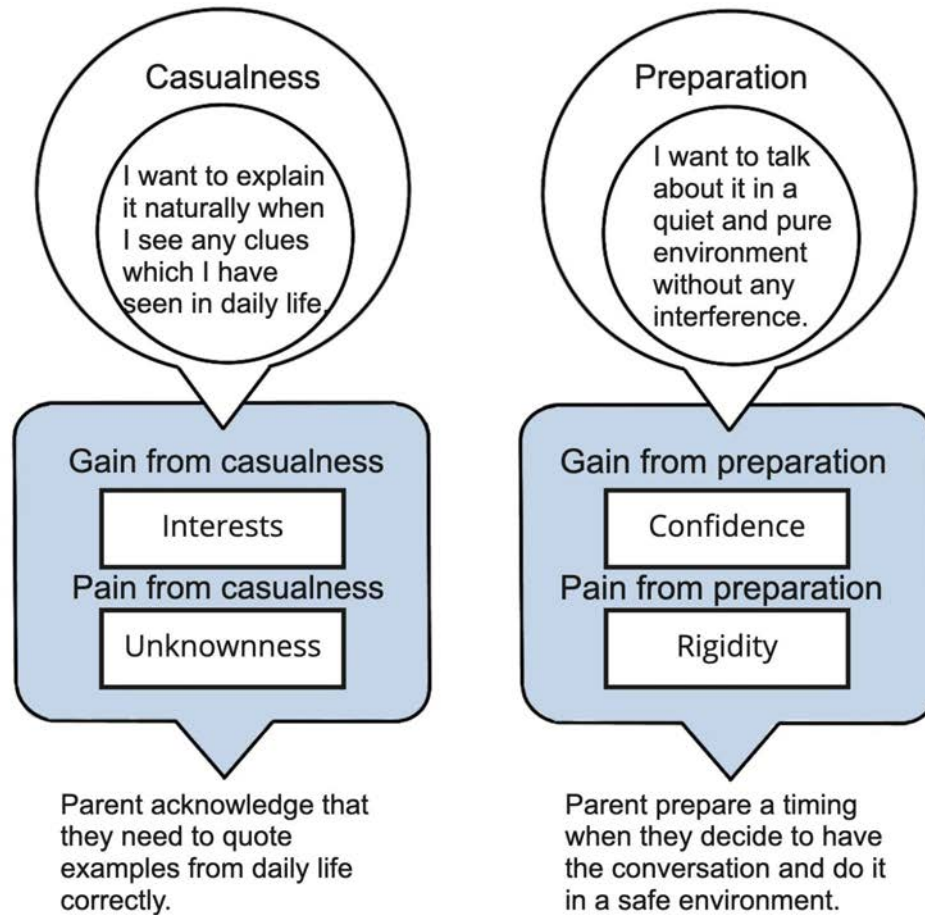
Figure 3.7. Framework of dilemmas, illustrating the conflicts between casualness and preparation

Parents can explain the concept of death when they see anything related to death and the unexpected conversations will trigger many interests. The existing things in nature can be referred to and easily found. However, on the other hand, parents also want to prepare a safe environment so that children will feel more safe and protected.

Design problem toward these dilemmas: What kind of a tool can be designed to be used in a prepared safe environment where the daily life examples can still be seen?
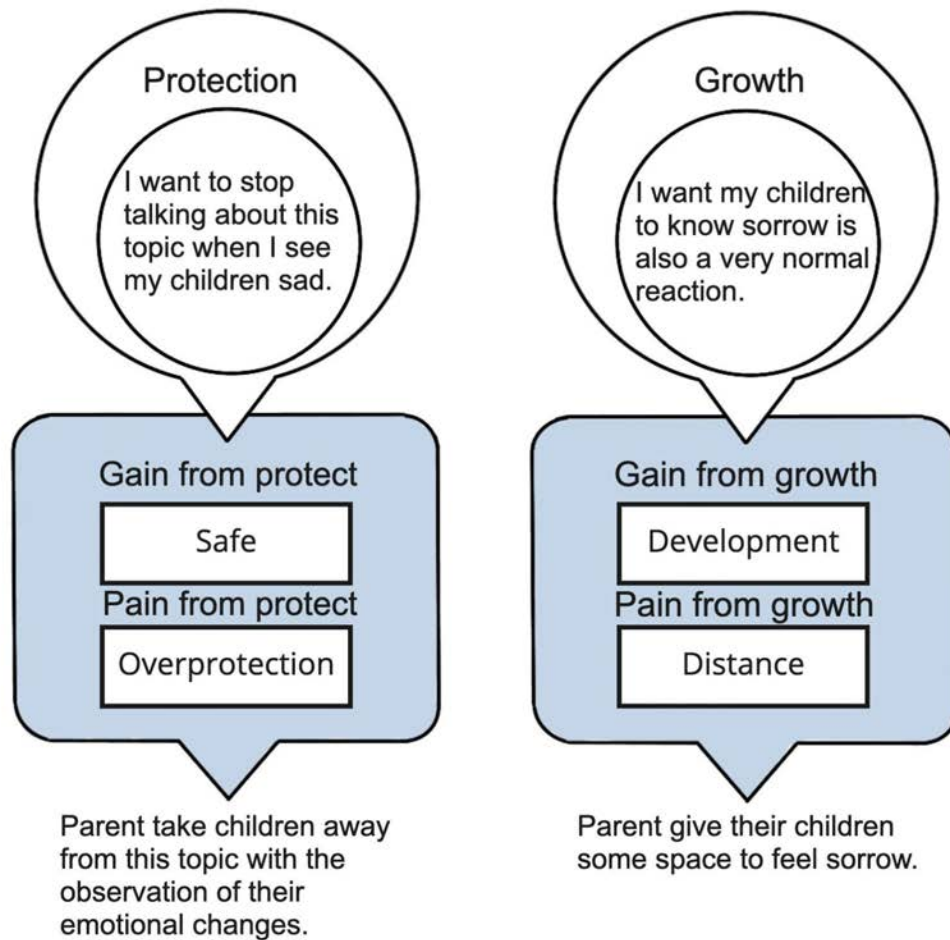
Dilemmas of degree of perception

Figure 3.8. Framework of dilemmas, illustrating the conflicts between protection and growth

As it is shown in Figure 3.8, the balance of protecting children and letting children grow is difficult to achieve for parents. On the one hand, parents see the children being sad and want to protect them from being too sad. This is how parents behave because parents always want to make sure that their children are safe. But on the other hand, sorrow is also a normal emotion toward death and dying. By knowing what sorrow means, children can develop themselves and mentally prepare well.

Design problem toward these dilemmas: What kind of a tool can be designed to include the sorrow experience but can also be stopped immediately?

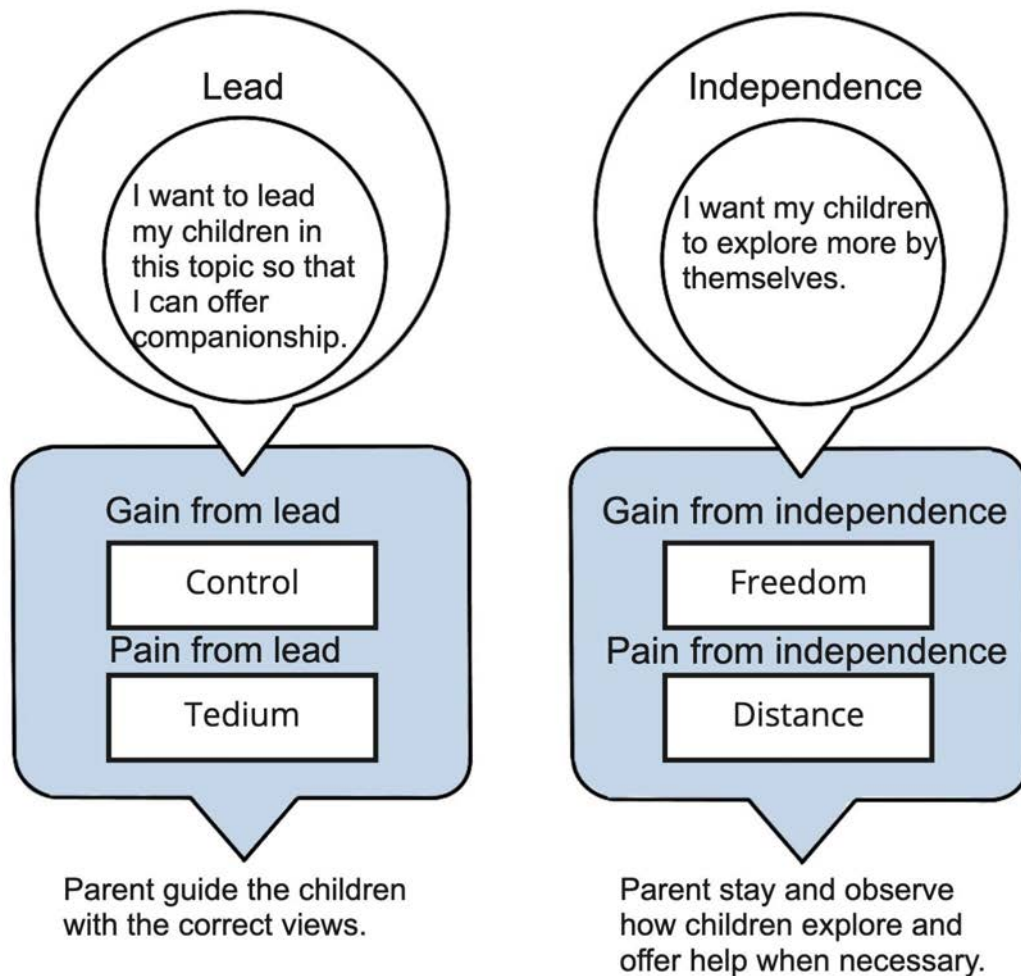**Dilemmas of the extent of parental involvement**

Figure 3.9. Framework of dilemmas, illustrating the conflicts between lead and independence

Parents want to take the initiative in guiding children to know more during the whole process of death education so that everything will be under control and meanwhile they will always stay with the children so that a warm companionship will be provided in this way. But the exploration of the children themselves is also valuable. By exploring it themselves, children will have better understanding and memories of the knowledge.

Design problem toward these dilemmas: What kind of a tool can be designed to guide the children with correct content in an explorative way?

3.3.Conclusion

In this chapter, user research has been done through interviews and analysed. Dilemma-driven design approach addressed the abstract topic into practical questions. A structure of the needs, dilemmas, insights from the parents is shown by Figure 3.10. The top part of Figure 3.10 is the three sequential stages. The seven summary steps are ordered by serial number for greater clarity. The bottom part of Figure 3.10 is a detailed structure explaining the preparation and operation stage.

Step 1 is knowing the importance of death education and the information of the importance is described in literature and should be known before doing death education. Step 2 can be found in the detailed structure and parents should hold a positive attitude during the process for providing love and companionship for children. Besides, they should also prepare to interact and answer questions. Step 3 is choosing a proper tool as a support to tell the knowledge about death which is step 4. Two pairs of dilemmas define two problems. One is figuring out the way of explanation and the other one is to decide where and when to conduct death education. Step 5 and 6 are combined as participation in the detailed structure. Parents should focus on emotional changes and help children explore the topic. The dilemmas illustrate that parents need to take care of themselves whilst taking care of children. Besides, parents are also doubtful about how much they should participate in the activity as they want to lead but they also want children to explore. In addition, they should decide if they want to stop the activity or continue to let children experience more.

In a prepared safe environment, death education is conducted by using a design tool in a child-friendly way with natural introductions like some simple metaphors from the examples existing in nature. Children are allowed to explore the topic of death freely besides the lead of the parents. During the whole process, parents observe children's emotional changes and decide if a stop action needs to be taken. Additionally, there should also be space for the parents themselves to reflect on their own emotional changes. Parents should hold a positive attitude by offering lots of love and companionship for the children and also prepare to answer the questions asked by the children.

The result of user research is the input and guidance for the next chapter which is the design phase.
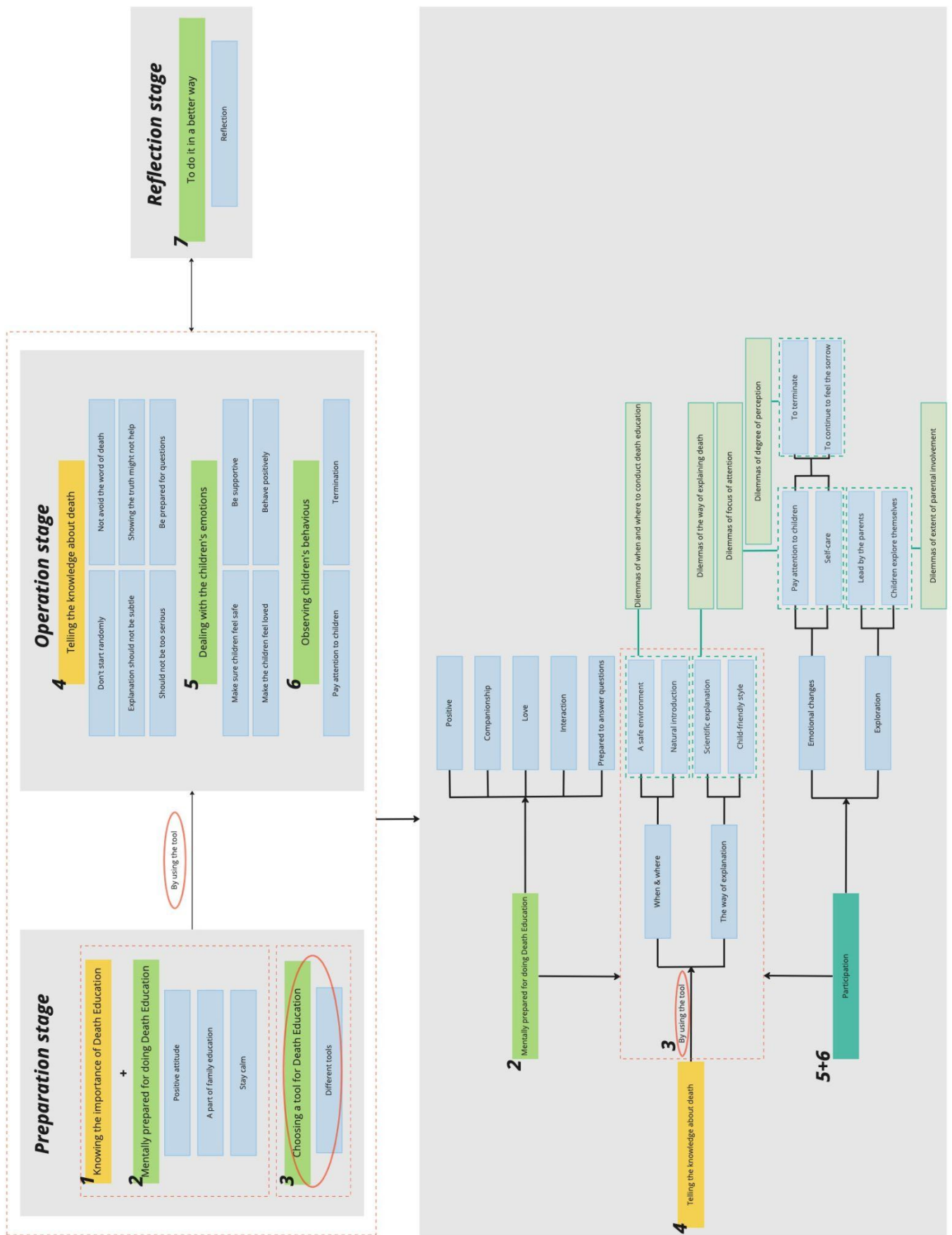
Preparation stage

1 Knowing the importance of Death Education

+

2 Mentally prepared for doing Death Education

- Positive attitude
- A part of family education
- Stay calm

3 Choosing a tool for Death Education

- Different tools

Operation stage

4 Telling the knowledge about death

- Don't start randomly
- Not avoid the word of death
- Explanation should not be subtle
- Showing the truth might not help
- Should not be too serious
- Be prepared for questions

5 Dealing with the children's emotions

- Make sure children feel safe
- Be supportive
- Make the children feel loved
- Behave positively

6 Observing children's behavious

- Pay attention to children
- Termination

Reflection stage

7 To do it in a better way

- Reflection

By using the tool

---

2 Mentally prepared for doing Death Education

- Positive
- Companionship
- Love
- Interaction
- Prepared to answer questions

3 By using the tool

Telling the knowledge about death

- When & where
  - A safe environment
  - Natural introduction
- The way of explanation
  - Scientific explanation
  - Child-friendly style

Dilemmas of when and where to conduct death education

Dilemmas of the way of explaining death

Dilemmas of focus of attention

4 Telling the knowledge about death

5+6 Participation

- Emotional changes
  - Pay attention to children
  - Self-care
- Exploration
  - Lead by the parents
  - Children explore themselves

Dilemmas of degree of perception
- To terminate
- To continue to feel the sorrow

Dilemmas of extent of parental involvement

Figure 3.10. Summary of user research results

4. Design phase

Based on all the research results, this chapter shows how the needs from the participants and problems defined previously are addressed by designing. With the evaluation, the result of the design turns out to be positive and helps parents carry out death education.
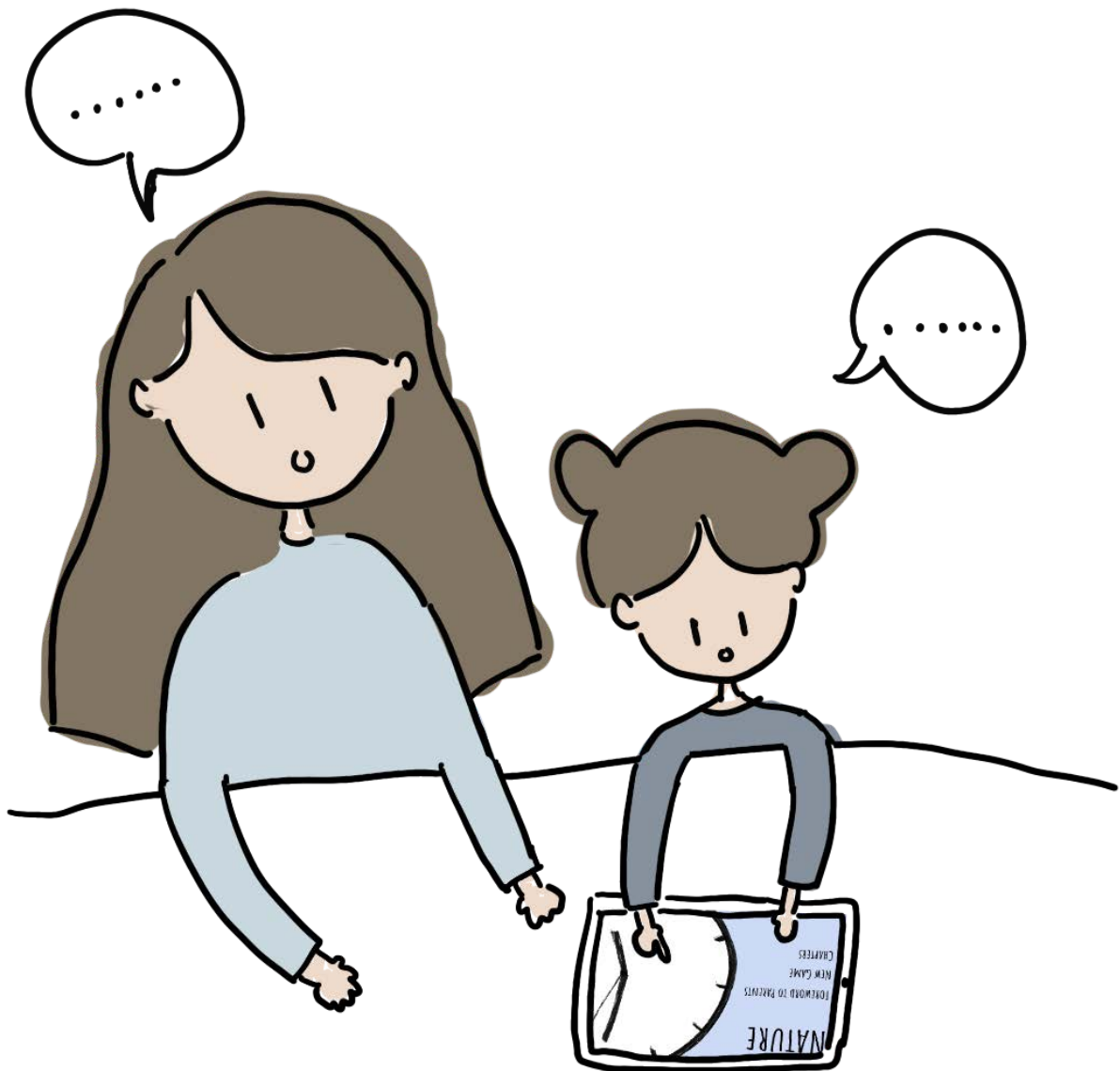
4.1.Ideation

It is time to address all the components by designing from ideation now that the user research summary results (see Figure 3.10) demonstrate the challenges participants have when completing death education as well as the needs and expectations they hope to reach during the entire process.

In the ideation chapter, the characteristics of the design are the initial insights for the design and the analysis of the existing design concepts provides inspiration for the design.

4.1.1.Characteristics of the design

There are many elements shown in the summary of user research results and they all mean some requirements for the design.

By adding words on the yellow sticky notes, the requirements are addressed. The places of the yellow sticky notes mean which needs or dilemmas the requirements address. Figure 4.1 shows how I use just one word to describe each requirement and all the requirements will be explained later in more detail from left to right and from top to bottom.

Figure 4.1. Requirements for the design

Knowledge

Enough knowledge should be the most important component of the design because it forms the basis of the entire procedure. The main goal of death education for children is to provide them a thorough understanding of death so they can grow in other areas, like handling emotions.

Empathic

Parents are urged to demonstrate empathy in order to comprehend their children's feelings. This compassion is reflected in the fact that parents are able to keep pace with their children in their death education. When they are at the same stage, parents can be more aware of how their children are feeling in the moment. Having understood the child's feelings, parents are able to give them positive support, help and love at the right time.

Interactive

Interaction is divided into two aspects. First, the interaction between parents and children makes the entire activity warm. In this situation, parents don't want to be separated from their children or leave them alone. As a result, while utilising the tool as intended, interactions like bodily interactions should be generated. Second, the interaction between the users (both parents and the children) and the intended tool enables parents and children to be involved in the activity together.

Communicable

Communicable is similar to the requirement of being interactive. But it intends more on communication with talking. The intended tool should also provide a space for parents and children to discuss any new ideas that arise throughout the duration of the activity so that a deeper comprehension will be achieved.

Convenient

When parents use the intended tool to prepare for death education, it shouldn't be overly complicated because that will cause chaos and make death education difficult to implement. Additionally, it should also be easy to use by the parents and children otherwise too much time will be spent on figuring out how to use the tool rather than focusing on death education itself.

Informative

Being Informative can be described as "having enough knowledge" as well. The slight difference is, being informative means more elements added besides knowledge. For instance, with the same knowledge there can be more examples for approval.

Scientific

There are various different perspectives of explaining death, including religious, philosophical, and other perspectives. In general, a scientific perspective will be easily and widely accepted by the majority of people. Additionally, conducting death education from a scientific standpoint does not necessarily rule out alternative viewpoints. Because we want to avoid creating too much confusion, other perspectives won't be mentioned.

Childlike features

To attract more attention from children and also be more easily perceived by children, the whole style should be children-friendly.

Process

Parents do not carry out death education without any organisations. Not every detail needs to be finalised because it is impossible and difficult to consider all the unexpected and potential reactions from children. However, at least there should be a structure or a framework for the parents to conduct death education. Parents will feel more at ease knowing they can control the situation and manage the activity.

Safe

The intended tool should be safe to use. Despite the fact that this is a really extreme matter, parents still don't want to cause their children too much harm. Children shouldn't be harmed by it, and it should be easy to stop.

Simulative

For better comprehension, the process should have some simulative elements so that children can touch and feel the topic more concretely.

Explorative

Throughout the process of death education, children's spontaneous exploration can deepen their understanding. This also enables children to be involved more. Besides, children will pay more attention during the whole process.

These design requirements could be divided into three categories as shown in Figure 4.2, which makes them easier to understand and manage.
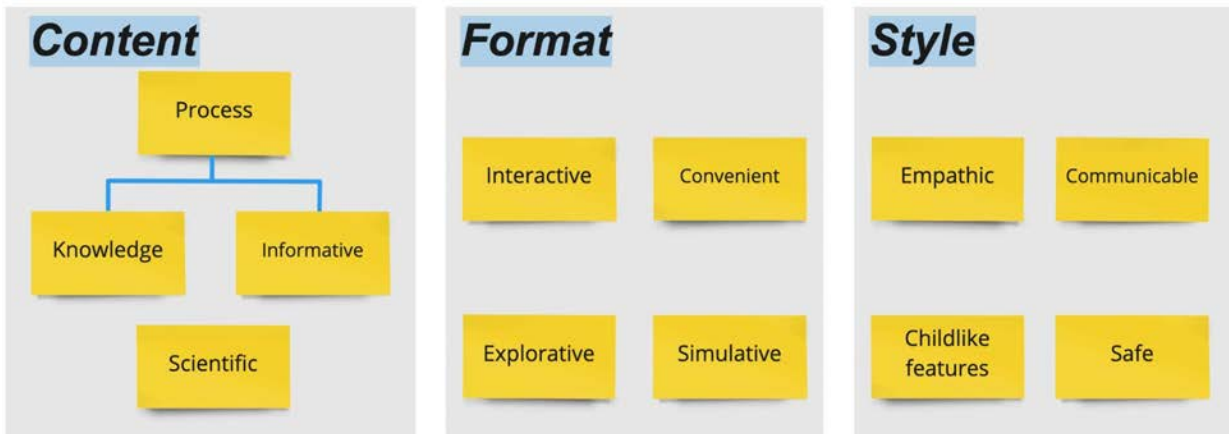

Figure 4.2. Three categories of design requirements

The content with the intended tool should have a process and the process will be a structure of sharing informative knowledge based on a scientific perspective. The format of the design should be convenient and allow lots of interaction, exploration and simulation to happen. In general, the style of the design should be safe with children-friendly features and trigger the parents' empathy so that communication will occur naturally.

4.1.2.Existing design concepts

In the user research phase, many existing designs are mentioned by the participants as useful support for the parents to carry out death education. A look at some of the existing design concepts will show how the design requirements discussed above have been realised and will also inspire further ideas.

Children's books related to death education

Figure 4.3 shows some classic children's books related to death education subjects.

Figure 4.3. Classic children's books related to death education

Normally, the children's books are with cartoon and animation style and all of the children's books shown above focus on a different emphasis.

The Fall of Freddie the Leaf tells the story of a leaf going through the four seasons. The author shows the journey of life and illustrates the value of its existence. As already introduced in the user research chapter, Kikker en het vogletje tells a story about a frog who found a dead bird but didn't understand what happened and in the end he managed to bury the bird with his friends. *De Mooiste Begrafenis van de Wereld* (translated as *The Most Beautiful Funeral in the World*) is a story about a boy who buried all the dead animals he saw in the village and tried to make beautiful funerals for the animals with his friends together. *I'll Always Love you* is about a boy who has been accompanying his pet dog who is growing old. Eventually the dog passes away and the boy remembers forever how much he loved the dog.

Table 4.1 and table 4.2 present the strengths and weaknesses of children's books in relation to the design requirements mentioned earlier, respectively.

Table 4.1. Strengths of children's books

Strengths	Specific reasons
Process	The books all focus on specific topics representatively. The parents and children can follow the story that the authors want to tell.
Knowledge	People can always choose the ones in which the scientific perspective of death is described.
Informative	
Scientific	
Childlike features	The books are always with children-friendly features and styles.
Safe	The content has been checked before publication and parents can choose to stop if they feel that is necessary.
Empathic	The stories are touching so that parents and children can immerse themselves together in the stories.
Communicable	After reading the books together, there is always time and possibility for parents and children to talk.

Table 4.2. Weaknesses of children's books

Weaknesses	Specific reasons
Convenient	Parents probably need to buy a lot of books and that makes reading not very convenient.
Interactive	Children will perform as the listeners in most cases. The only interaction between children and the books will be pointing or just looking at the books. However, the interaction between parents and children might happen, which is helpful. For the same reason, exploration and simulation are both lacking.
Explorative	
Simulative	

In general, the design of children's books related to death education is already very valuable for providing knowledge and comprehension for children in an acceptable way. The stories and the way of telling stories will generate lots of inspiration for design. As for books, it is true that the interaction, exploration and simulation will be difficult as that's not the aim of reading books.

Films related to death education
Films are, in a way, a progressive version of the books. There are many death education films not specifically for children but for everyone. Figure 4.4 shows some classic and well-known death education films which are more intended for children.

Figure 4.4. Classic children films related to death education

Coco tells the story of a young Mexican boy who, while secretly pursuing his musical dreams, reaches the world of the undead and reunites with his ancestors. *Soul* tells the story of a man who dreams of becoming a jazz pianist, meets a misanthropic soul and returns to the real world to find the meaning of life.

Table 4.3 and table 4.4 present the strengths and weaknesses of films in relation to the design requirements mentioned earlier.

Table 4.3. Strengths of films

Strengths	Specific reasons
Process	The films all have story lines and the script is complete.
Convenient	It is not difficult to watch a film together and it is also very entertaining so children would like to do.
Childlike features	The films are not just for children but children can still easily understand.
Safe	The content has been checked before launching and parents can also choose to stop watching if they feel that is necessary.
Empathic	If parents and children watch together, they will be focused and understand the stories.
Communicable	Even though it is not easy to talk while watching the film, parents and children can always talk about the story after watching.

Table 4.4. Weaknesses of films

Weaknesses	Specific reasons
Scientific	There will be some religious elements and not following only scientific perspectives.
Knowledge	Of course the story is always based on some information but in a film, the story is more important than the knowledge.
Informative	
Interactive	The children will mostly follow the story of the films and be watching all the time so it is lacking interaction, exploration and simulation.
Explorative	
Simulative	

With outstanding stories presented in the films dedicated to death education, children will see different aspects of death and dying in a warm and entertaining way.

Playset with a death education aim

Figure 4.5 shows an example of a playset with a death education aim and it is for designing and building one's own graveyard so that during the process, death will be talked about together.

Figure 4.5. Children playset for building graveyard

Table 4.5 and table 4.6 state the strengths and weaknesses of the playset.

Table 4.5. Strengths of a playset

Strengths	Specific reasons
Interactive	The way of playing is interaction with the playset and children will interact with parents while playing together.
Explorative	There are many ways of building the blocks and children can use their imagination to create.
Simulative	While building a graveyard, children put themselves into the

	situation and try to feel what a funeral means.
Safe	The playset won't hurt children too much and can be stopped easily.
Childlike features	Children prefer playing something like the blocks. The playset will appeal their attention.
Communicable	While playing, children and parents talk and discuss together.
Empathic	After listening to children about what they want to make, parents understand how children comprehend this topic.

Table 4.6. Weaknesses of a playset

Weaknesses	Specific reasons
Process	The way of playing is flexible and there is no process guiding the whole activity.
Knowledge	As children and parents will be more focused on playing and creating, less knowledge is provided during the period.
Informative	
Scientific	
Convenient	It requires children to build or create which might be difficult sometimes. Besides, it needs more space, a certain environment which makes the activity not that convenient.

Compared to the books and films, playsets have more explorative and interactive features. This also provides a direction for the design to achieve some interactive and explorative goals.

4.1.3.Concept idea

The characteristics of the design have been identified and some related designs are analysed. Now we need a floor to organise all the design requirements and put all the inspiration together to generate a concrete idea concept. After researching the ways of implementing death education, serious games became an interesting way. I once played a serious game which was about telling the story of the concept of love and romantic relationships. Love and relationships are also abstract topics, and there is a lot of academic research on relationships. A serious game about exploring relationships

can cover most of the design needs discussed above, while presenting an abstract problem to the user in a more light-hearted design language.

Serious game

Abt defined serious games as games with explicit and carefully thought-out educational purposes and are not intended to be played primarily for amusement (1987, p.9). Similarly, serious games, as stated by Michael and Chen, are referred to games with a primary goal other than simple amusement and entertainment (2005). Death education, as part of education, can therefore be put in a game way to conduct.

Inspirations

As Prager and Acosta suggested, parents can show their children dead butterflies and rotting fruit in the garden to help them understand death better, or even use bursting bubbles to explain the end of life in a vivid way (2010). This actually matches the one of the user research results which says death can be addressed by some natural examples. As discussed previously, children's books related to death education always use simple imagery to explain the complicated truth of death. Figure 4.6 shows how Leo Buscaglia addressed death by using the example of a leaf's seasonal changes in his book *The Fall of Freddie the Leaf*.

Figure 4.6. A leaf's seasonal changes

Advancely, the death of an animal, or a pet is further than the death of a plant because the connection is stronger since animals are more alive. As shown in Figure 4.7, the book *Kikker en het vogeltje* draws the picture of the dead bird directly.

Figure 4.7. The dead bird in *Kikker en het vogeltje*

Additionally, Figure 4.8 illustrates the growth and death of a boy's puppy (in the book *I'll Alway Love You*).

Figure 4.8. The life journey of the puppy

In Figure 4.8, the boy had fun with the puppy by doing different things together and they went to the veterinary clinic because the puppy was ill and in the end the puppy died.

Holding a funeral is also a part of death. In children's books, funerals as an important element can often be seen (see Figure 4.9). The importance of holding a funeral was discussed by Walter as realising the sorrow, respecting life, feeling supportive, etc (2017, pp.59-69).

Figure 4.9. Funeral scenes in children's books

Preliminary idea of the design content

Combining all the inspirations and the idea of making a serious game, the initial idea of the design content is shown in Figure 4.10.
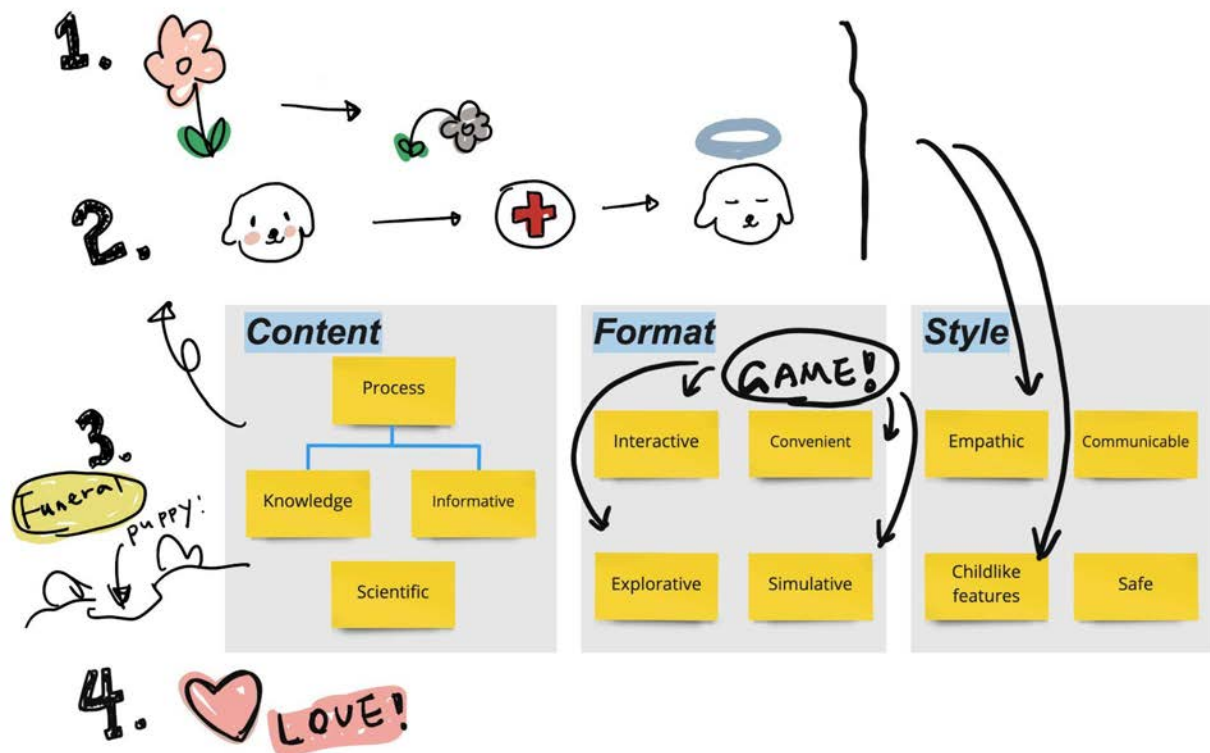
Figure 4.10. Initial idea of design content

The content of the game will follow four steps: (1) the growth and death of the plant; (2) the growth and death of the puppy pet; (3) the funeral for the death; (4) the love exists

after the death of the puppy. The flow will tell a story and trigger empathy. The game should allow the children to explore a lot and will be made in a children-friendly style.

4.2. Design
4.2.1. Prototype

The prototype has been made into a serious video game and is built on the Figma platform, which can be tried out via the link (https://www.figma.com/proto/gNSp65KSeVOc47bh91po1o/Nature?node-id=4%3A4&scaling=scale-down&page-id=0%3A1&starting-point-node-id=4%3A4). It can be played on various devices, including laptops and tablets. Ideally, it could also be used on mobile phones like other video games, but due to concerns that the screens of mobile phones might be too small for the next test, the game was only available on laptops and tablets for this project, as shown in Figure 4.11.
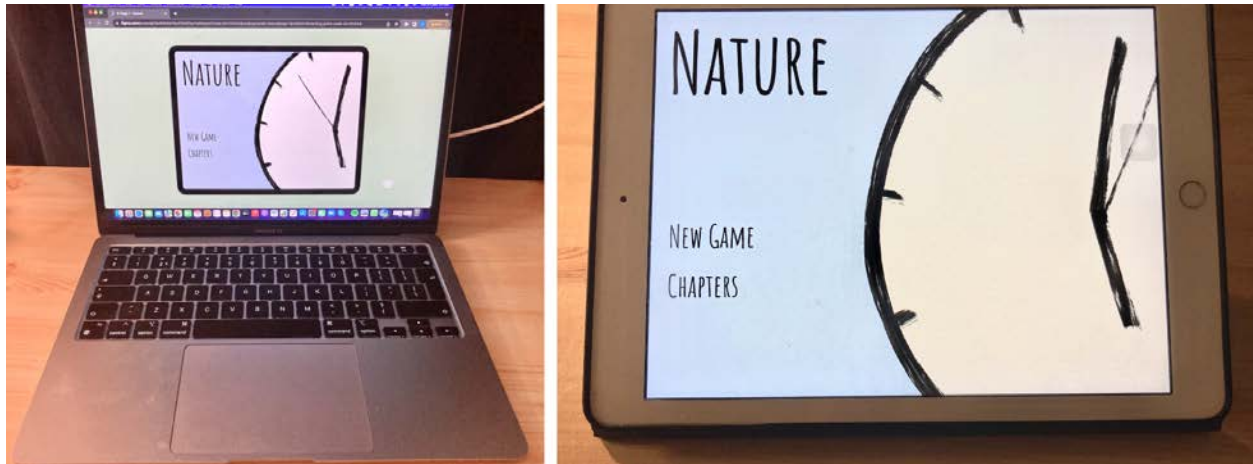
Figure 4.11. The prototype runs on the laptop and the tablet

In this chapter we will give a general overview of the storyline of the prototype and how this game attempts to solve parents' dilemmas. Details of the game can be found in the appendix.

A screenshot of the prototype building page is shown in Figure 4.12. The blue arrows indicate the working process, and each rectangle represents a scene from the game's interface.
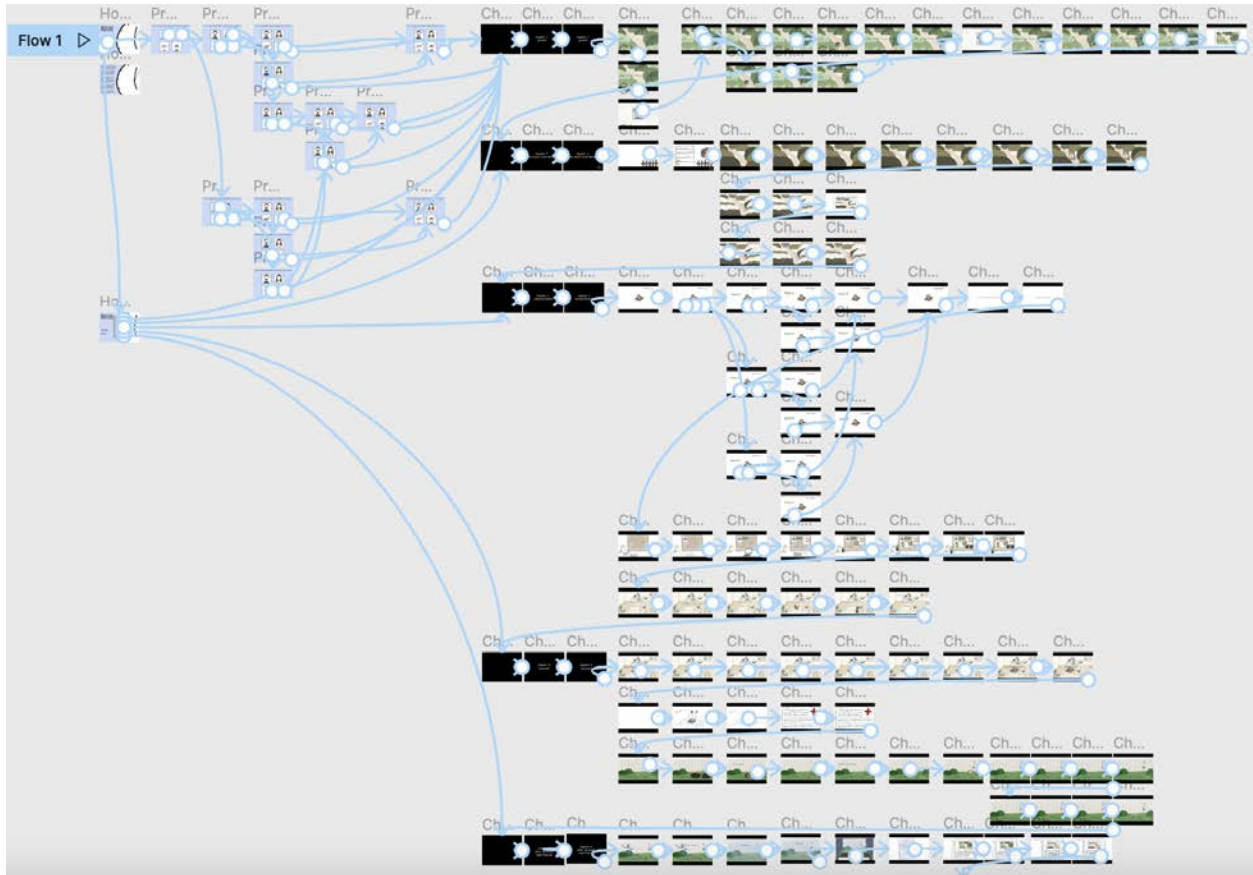
Figure 4.12. Overview of the prototype building page

For instance, the "NEW GAME" button is linked to the "profile page" with a blue arrow, as shown in Figure 4.13. The "profile page" will appear when users click the "NEW GAME" button on the game's interface. The players will be directed to the appropriate pages by all clickable elements.
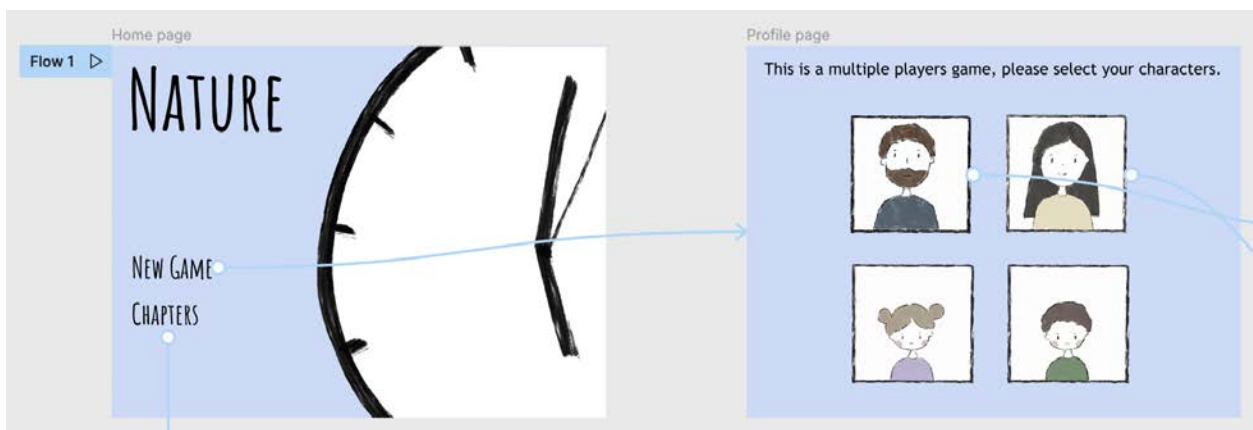
Figure 4.13. An example of how the arrow works

The game is designed for both the parents and the children. When the game starts, players need to choose their avatars in the profile page (see in Figure 4.14).

Figure 4.14. Profile page

Only if there are both parent (parents) and child (children) participating, the game can be started. Although we cannot be certain that the parents and children have selected the correct profile (for example, the children can choose the parents and children on their own), this page at least makes it clear that this is a game for parents and children.

Storyline
The main structure of the game is a story containing the content of the game which has been discussed in the 'concept idea' chapter as four steps: (1) the growth and death of the plant; (2) the growth and death of the puppy pet; (3) the funeral for the death; (4) the love exists after the death of the puppy.

Within the three main sceneries, Figure 4.15 illustrates the growth and death of several plants. The 'watering can' and 'fertiliser bag' can be clicked by players to water and

fertilise the plants, which will cause the flowers to bloom as seen in the middle image. As the seasons change, the blooms will decay.

Figure 4.15. The process of step 1

The second step is the growth and death of the puppy pet as shown in Figure 4.16. By clicking on various elements in the middle image, players can aid the puppy's growth after finding it (the left image). For instance, the medicine will make the puppy stronger while the ball will keep the puppy active and happy. The game's full content also includes some more interactions, such as taking photos for the puppy and staying together with the puppy at home. In the end, a veterinary clinic determines that the dog is dead. This describes the puppy's growth and death.
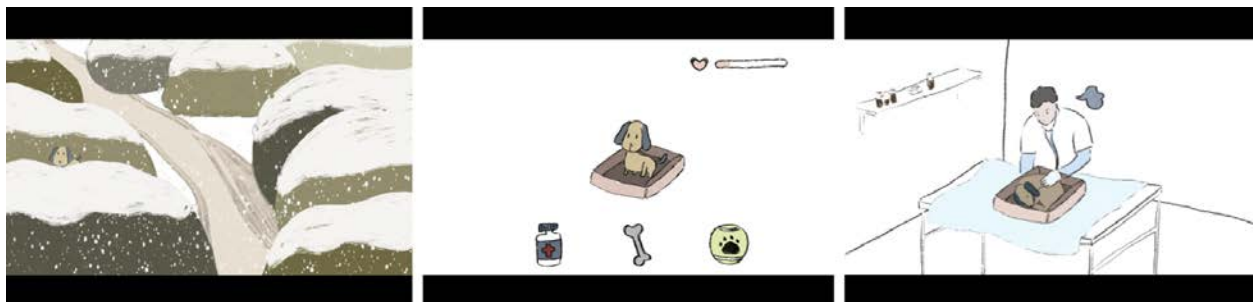
Figure 4.16. The process of step 2

The third step is a simple burial procedure for the puppy, as shown in Figure 4.17. The player needs to use the 'shovel' element to dig a hole in the ground and bury the puppy. In the full content of the game, the player can also plant some flowers here, as one sometimes does in a real cemetery.
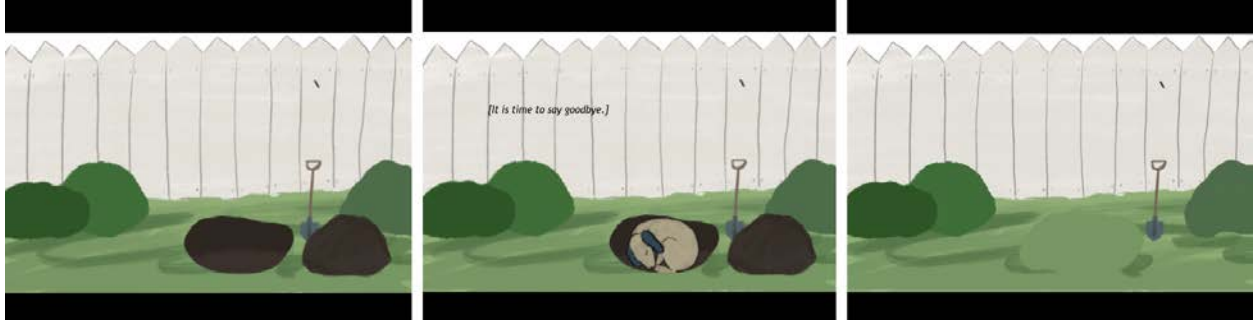
Figure 4.17. The process of step 3

Step 4 aims at indicating that love exists after the death of the puppy (see in Figure 4.18). Players will read the album together and they will see the photos of both the flowers and the puppy in the album. The text in the album affirms that love still exists and in the final scene, the flowers and the rainbow create a warm atmosphere that stimulates an optimistic perspective and exudes a sense of love.

Figure 4.18. The process of step 4

Solve parents' dilemmas

In the user research phase, we have found 5 groups of core dilemmas. They are the guidance of how this game is designed.

It can be challenging to strike a balance between expressing the scientific truth and doing so in a way that is more beautiful when it comes to the dilemmas of the way of explaining death. The plot in this game begins with the growth and death of plants, a fundamental example that can be found in nature, and moves on to the growth and death of a puppy, an animal that is more alive than plants. These two examples illustrate the cyclical nature of life. Furthermore, in this game, the word "death" is used directly; the truth is not concealed behind beautiful rhetoric. Religious explanation is not included either.The plot of this story is structured in a scientific manner. Children can readily comprehend the explanations because the words are not complicated and are found in some children's books. Additionally, the game's design is very children-friendly. Parents can generally use this animation to explain the knowledge of death to children.

For the dilemmas of focus of attention, the game can also be helpful. It is possible for both parents and kids to actively control and click the screen. However, the clickable elements are more interesting for children, as we can see that in real life children are easily attracted to games. Therefore, we expect that in most cases children will be the ones playing the game with the screen, while the parents will accompany them from the sidelines. During this process, the parents can observe the child's behaviour and reactions. On the other hand, the process is experienced jointly by the parent and the child. The parents will have their own space to reflect on the situation and think about the topic during this period.

Dilemmas of when and where to conduct death education indicates that there is a conflict between conversations that pops up when parents see anything related to death in their lives and conversations that take place in a safe and prepared environment. In the story of the game, there are some natural elements, such as plants. There are natural elements in the story of the game, such as plants. Parents can easily relate to this story when they want to give a clear explanation from the examples they see. The game can also be used as a support when parents are ready to have a conversation in a safe environment.

Parents want to stop when they see children being sad, but they also want them to understand that sorrow is a normal emotion and this conflict leads to the dilemmas of degree of perception. The content of the game is not too extreme but different children may have different levels of acceptance. If the parents feel it necessary, the game can be stopped immediately. And if the children are able to explore the story, it will be a simulation for experiencing loss. Parents can stop the game immediately if they feel the need to do so. And if the children are able to explore the story, this will be a simulation of experiencing loss. This satisfies the parents' need to stop the conversation and helps their children understand what loss and grief feels like.

Dilemmas of the extent of parental involvement indicates that parents want their children to explore the topic more on their own, but they also want to lead their children in the exploration of this topic. The games allow children to explore the story as it develops, while parents can also provide some help in the process.

4.2.2. Design characteristics analysis

The explanation of the prototype focuses on the game's storyline and how the game solves the dilemmas identified during the user research phase. Several design characteristics words help shape the design in terms of content, format and style (see in Figure 4.2).

Content- process, knowledge, informative, scientific

The process of how the parents conduct death education by using the design is structured in a flow of the story. The story includes scientific and informative knowledge about how the plants and animals grow and die and beyond death, a positive attitude is also important through the acknowledgement that love still exists.

Format- interactive, convenient, explorative, simulative

Parents only need to have a laptop or a tablet to use the game and it can be taken anywhere more easily than buying different books and taking some playsets. During the game, children are able to explore the topic in which the game develops. For example, as shown in Figure 4.19, plants can only grow after being watered and fertilised by clicking the 'watering can' and 'fertiliser bag'. Clicking on other parts of the interface will not help the plants to grow. Interactive elements like these buttons allow children to explore how to help the plants and the puppy to grow and to witness the process of their death on their own. In addition, the children complete the simulation when they go through the story and see the process.
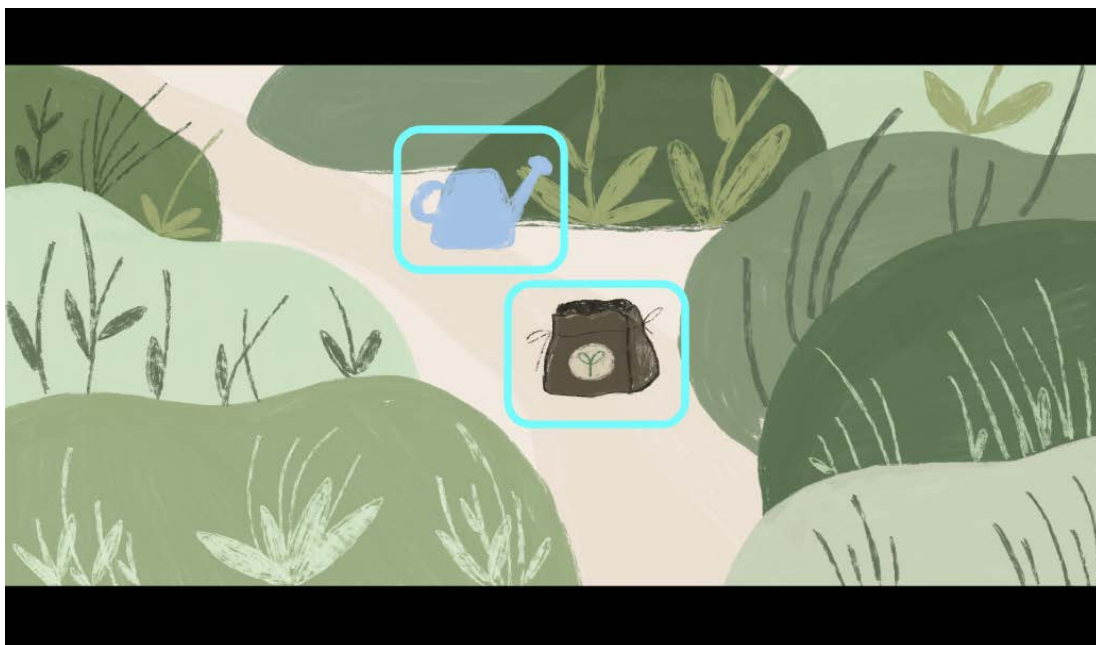
Figure 4.19. An example of the explorative elements

Style- empathic, communicable, childlike features, safe

The whole game is drawn in an animated style, while the examples used are flora and fauna elements that children can easily accept. As the overall setting of the story in the game is not extreme, it is safe for children to use and will not cause too much unexpected harm. The information in the game can provoke communication between parents and children. Overall, the story is empathetic and moving, and therefore enables parents and children to spontaneously create a deeper emotional connection in the process.

4.3.Midterm evaluation

Among the five group participants, four groups participants took part in the midterm evaluation and the rest one (P4 & P5) could not make it due to some personal reasons. Two groups (P3; P6) joined online due to and the rest two groups (P1 & P2; P7) participated offline.

The participants in the user research phase were invited for the midterm evaluation. All the participants firstly tried the game and then shared their insights about the five dilemmas to see to what extent this prototype solved the dilemmas. Besides, they were also asked to score the twelve design characteristics (from 0 to 10, 0 being the worst and 10 being the best). For those participants who joined online, they were first invited to an online meeting room. The link of the game was sent to the participants in advance and they were able to open the game through the link on the webpage. Online participants were asked to share their screens so that they could more easily know their progress in the game (see in Figure 4.20).
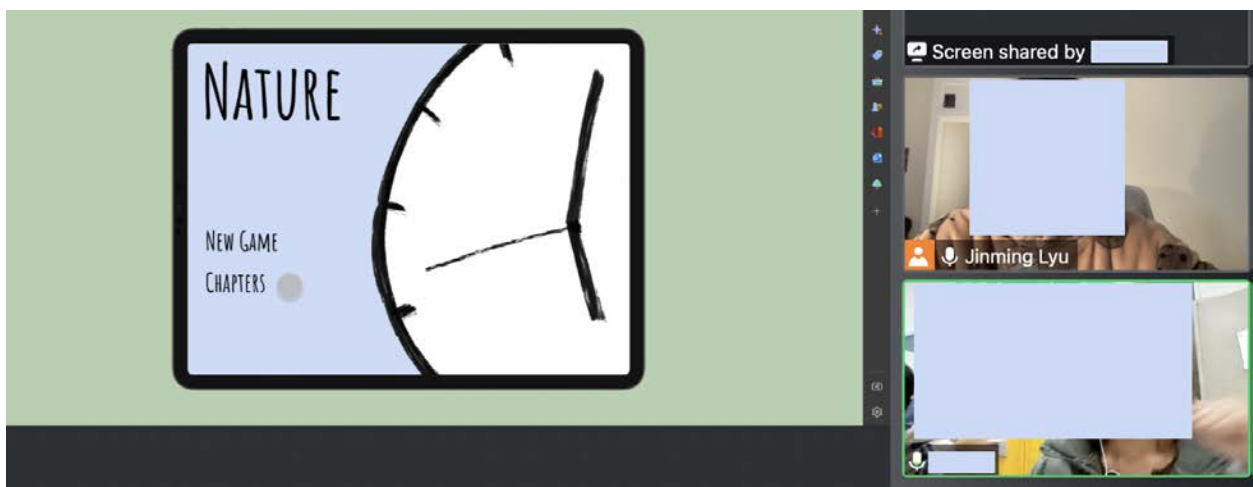

Figure 4.20. Online evaluation screenshot

For dilemmas of the way of explaining death

All participants agreed that the game introduces the concept of death clearly in a scientific way together with a children-friendly style.

[P3] indicated that the design of the game will attract children's attention easily and it provides a way for children to know about this subject as her children do not start the exploration by themselves. [P6] liked "the balance between science and the fairytale" and for children, she agrees that the transition from the plants to the animal will help children eventually get to know the knowledge step by step. [P7] pointed out that "the most scientific element is the diagnosis in the veterinary clinic" (see Appendix Figure a.29) and "the whole story counteracts the sorrow of death".

For dilemmas of focus of attention

Although the parents' emotions were taken into account during the design, the resolution of these dilemmas was unsatisfactory during the evaluation phase, as most of the participants felt that they would be more concerned about their children throughout the process of the game.

[P1] shared a lot of insights with this group of dilemmas as she found it very important to take care of themselves as parents when carrying out any education activities especially death education to their children. "The parents' feeling is important and only when I can reflect on my own and face up to death in a normal way, I can help my children." ([P1]) [P1 & P2] felt the game "is more on children's perspective and neglects how parents feel". Their children might be impatient while playing and would not care about their parents. [P3] had the same feeling that "parents may not be cared for in the process". [P6] didn't see "the mirror for parents to reflect" in the game and this also indicated that there is no space for parents to think what they feel during the process.

For further iteration, [P1 & P2] suggested that perhaps some actions in the game can only be taken by parents so that parents and children can play the game separately for some steps.

For dilemmas of when and where to conduct death education

The majority of participants were satisfied with the handling of these dilemmas, as they saw some explanations in the game that fitted with simple examples from life and recognised that the use of this game was well suited to a safe environment.

[P1 & P2] said that the game is able to meet the sudden need when parents improvise and want to play the game with their children. [P7] compared the two cases in the

dilemmas. One is doing death education in an unexpected environment when some examples pop up and the other one is a prepared safe environment. He would like to use the game when he was triggered to tell about death when he sees something related to death and the examples are exactly what he would like to refer to when conducting death education. For a prepared safe environment, using the game also conveys a warm atmosphere where parents and children can chill and play together.

For dilemmas of degree of perception
Most participants did not feel the existence of this set of dilemmas after trying the game.

For most parents, they did not feel too sad from the game. [P3] said "parents won't feel too sad because as adults we can bear this level" and [P7] also stated that he didn't feel it necessarily needs to be stopped anywhere in the game. [P1] even suggested that the story in the game can be more sad so that the simulation will be more real for her children. Parents are adults and they have the ability to deal with a simple story related to death. However, just because parents don't feel these dilemmas doesn't mean they don't really exist. Different children have different levels of acceptance so if children are too sad the game can still be stopped easily.

For dilemmas of the extent of parental involvement
The participants' attitude towards the resolution of the dilemmas in this group was also less than satisfactory overall as most of them didn't feel that parents provide enough support during the process.

[P1 & P2] pointed out that "parents' support can be more obvious" and she also understood that "this definitely depends on the parents because some parents would like to tell more but the game should also directly guide the parents to provide help". [P3] would also like to see "some more space for parents to help children and communicate together". [P6] agreed that the game allows children to explore and "at what position a parent should be" still needs to be considered. In her opinion, parents as "accompanying collaborators" need to "answer some questions" during the process. [P7] also mentioned that "parental involvement is a bit low".

For further iteration, [P3] suggested that there could be tips for parents in the game, so that they can be reminded to be proactive and help with explanations in certain spots. [P6] even makes the "tips" more concrete as "a list of words" which help to explain the story and the concept of death.

Feedback for content- process, knowledge, informative, scientific

The scores for the process were 8, 8, 9 and 9, with an average score of 8.5. The game process, which is developed through a storyline that transitions from plants to animals, is capable of satisfying the participants.

The scores for the knowledge in the game were 3, 6, 6 and 5, with an average score of 5. Similarly, the scores for the characteristic 'informative' were 7, 6, 6 and 5, with an average score of 6. Most of the participants felt that in general the amount of knowledge contained in the game was a bit low for parents but for children's perception level, it is enough. [P3] stated that "there are many interfaces in the game and for each interface there are actually many small knowledge points but for children, it is difficult to get all the knowledge". For further development, participants suggested that "a conclusion page for guiding the parents to start reflecting may help" ([P3]) and "more explanation words for parents will make the score from 6 to 9" ([P6]).

The scores for the characteristic 'scientific' were 7, 8, 10 and 9, with an average score of 8.5. The structure of the storyline in the game is scientific and it is clear to parents according to their feedback.

Most of the shortcomings at the content are in the further explanation of knowledge. The content can be made clearer if the parents are helped to explain it more during the game.

Feedback for format- interactive, convenient, explorative, simulative

The scores for the characteristic 'interactive' were 7, 8, 8 and 9, with an average score of 8. In most real cases, children will be the ones holding and clicking the screens. In the evaluation sessions, parents experienced how children would interact with the elements in the game. They liked how the game provides an interactive experience as they were not just watching the screens but needed to focus on the changes of the interfaces. Besides, for the interaction between parents and children, participants did not perceive that play on the screen created a barrier to interaction between parent and child. They could visualise their child "snuggling up with them in a comfortable position" ([P1&P2]) while playing a game.

The scores for the characteristic 'convenient' were 10, 9, 9 and 9, with an average score of 9.25. As discussed previously, the game is handy for parents to conduct death education.

The scores for the characteristic 'explorative' were 9, 7, 8 and 8, with an average score of 8. Participants agreed that the game gave the child a lot of exploration as "the

children themselves explored the whole story bit by bit from scratch" ([P6]). [P1] and [P7] focused on some elements and asked if those elements can also be clickable so that "children can explore this game world more" ([P7]). For instance, as shown in Figure 4.21, the elements in blue rectangles are suggested by [P1] to be clickable and guide to another interface for more exploration.
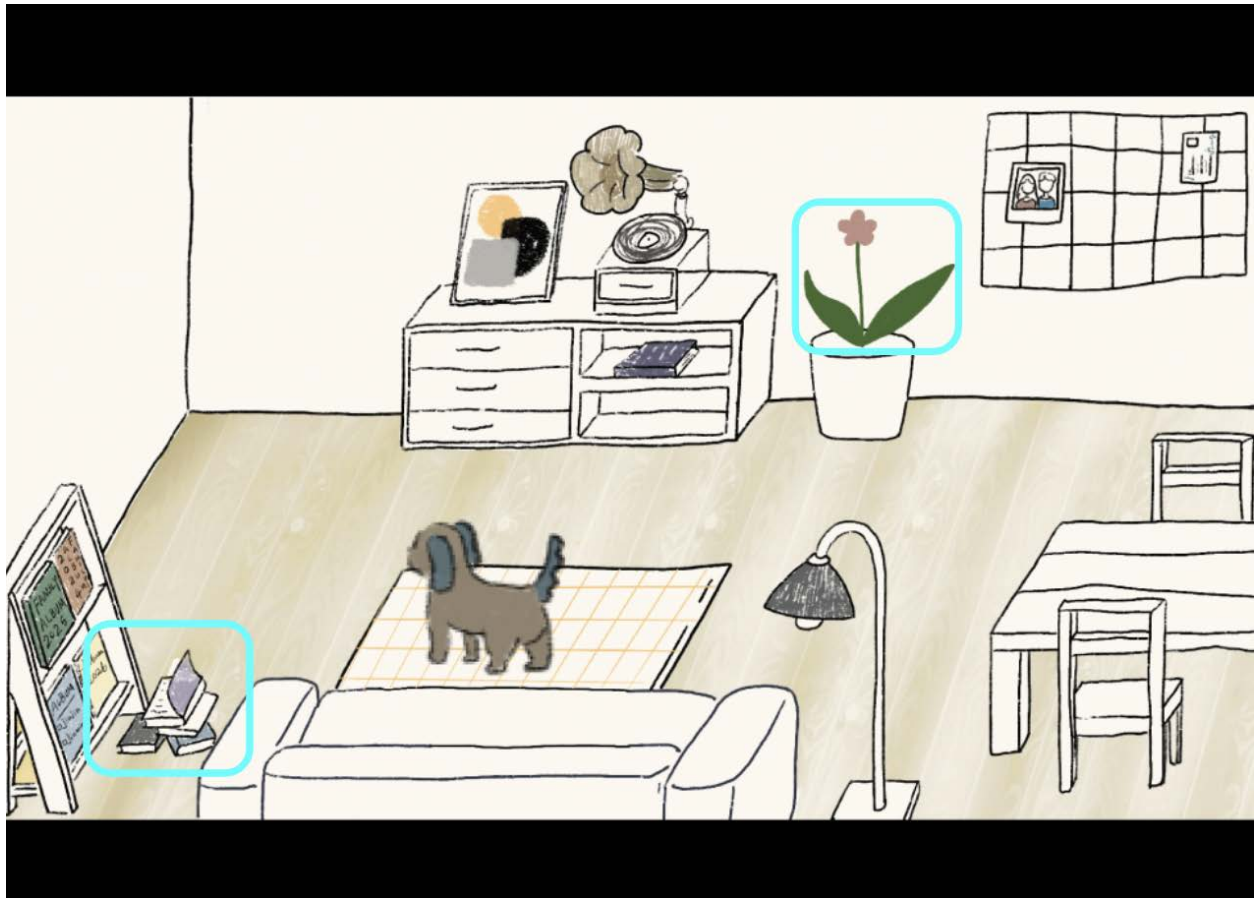

Figure 4.21. An example of more exploration

The scores for the characteristic 'simulative' were 8, 9, 9 and 6, with an average score of 8. In general, participants were satisfied with the simple simulation in the game for children to experience. There is a low score from [P7] and he suggested adding more interaction with the puppy so that a stronger connection will help children to understand the sadness better and more thoroughly.

In general, the format of this game is highly satisfying as it provides a space for children to explore and a simple simulation of feelings about death through the story.

Feedback for style- empathic, communicable, childlike features, safe

The scores for the characteristic 'empathic' were 7, 8, 7 and 8, with an average score of 7.5. The game is evaluated as creating a situation where parent-child empathy can remove the taboo nature of the topic ([P1]). Additionally, [P3] points out that this story in the game, although simple, still brings about some emotional ups and downs for parents who have reached adulthood, and that such emotional changes are also a source of empathy.

The scores for the characteristic 'communicable' were 9, 6, 7 and 6, with an average score of 7. Communication is "based on the parents' educational philosophy as well as their personal character" ([P6]). What we can do in this game should help parents, especially the ones who are not good at taking the initiative to communicate, try to communicate more.

The scores for the characteristic 'childlike features' were 9, 10, 9 and 10, with an average score of 9.5. In this game, there is no element of negativity that the child "would find offensive or feel fearful" ([P3]).

The scores for the characteristic 'safe' were 10, 9, 9 and 10, with an average score of 9.5. This consideration is related to the ethical and moral aspects of death education and should therefore be taken with great care.

4.4.Improvement

We have gained a lot of insights from the midterm evaluation session and for a better experience of the parent, improvements of the prototype will be done after analysing which aspects should be future developed.

Elements that won't be changed

More explorative elements have been suggested several times during the midterm evaluation by different participants. However, no more new explorative elements will be added in the game because we still want the children to focus on the main structure of the story. Current explorative elements are designed for children to discover the whole picture of the story and if more added, children might be distracted.

Some participants suggested that the simulation of experiencing the death of the puppy can be more harsh. For safety reasons, and to meet the psychological developmental level of most children, we have kept this simulation at its original level.

Things need to be improved

The problems from midterm evaluation focus on the lack of parental involvement, inadequate communication between parents and children, the lack of knowledge explanation and parents' neglect of their own emotions in the process.

The first improvement is an added foreword page for parents as shown in Figure 4.22.
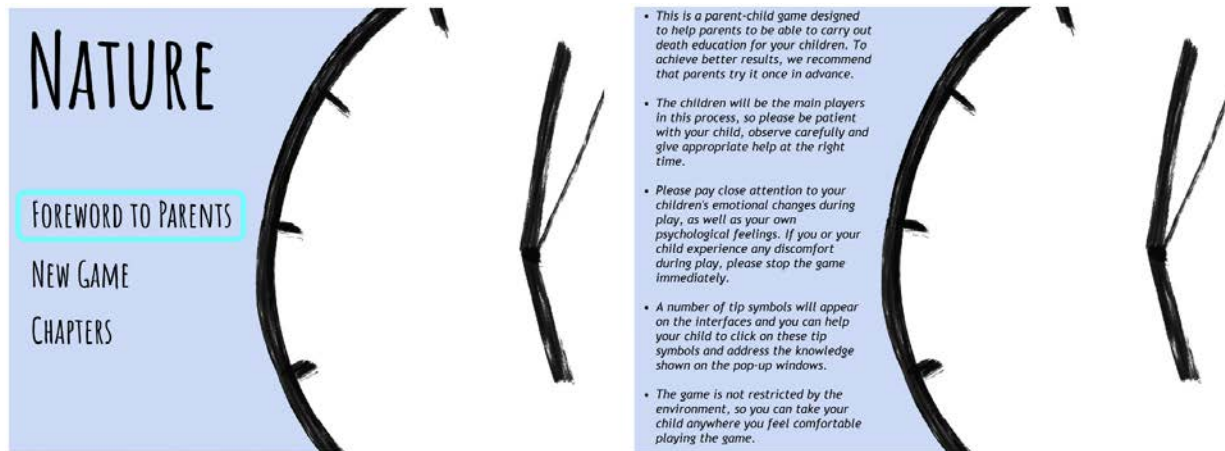

Figure 4.22. Foreword page

If clicking the button 'FOREWORD TO PARENTS' on the left image, it will lead the parents to the right interface where parents can read the foreword. Even though the 'profile page' already indicates that this is a parent-child game, this foreword makes it clearer. Additionally, the text reminds parents to take care of themselves as well. This page is written to the parents and parents will take action to read before children start the game. This action also tells children that parents are participating at the same time so that the involvement of parents will be more obvious.

The game tells the story with some scenes and simple words. For some parents, it is not difficult to expand on some of the extended knowledge told to their children. However, to help make it easier for parents to explain the knowledge in the story of the game to their children, the game will include some explanatory interfaces. Initially the game was improved in the form of a number of question marks placed in the interfaces, and when the question mark was clicked, explanatory sentences would pop up (see in Figure 4.23).

Figure 4.23. An example of initial improvement

The question marks would attract children's attention and help them to ask questions then parents can answer the questions. However, these question marks can also make the screen too confusing and distracting for the children. In the end, the placement of a hint symbol at the top right of the page is used (see in Figure 4.24).
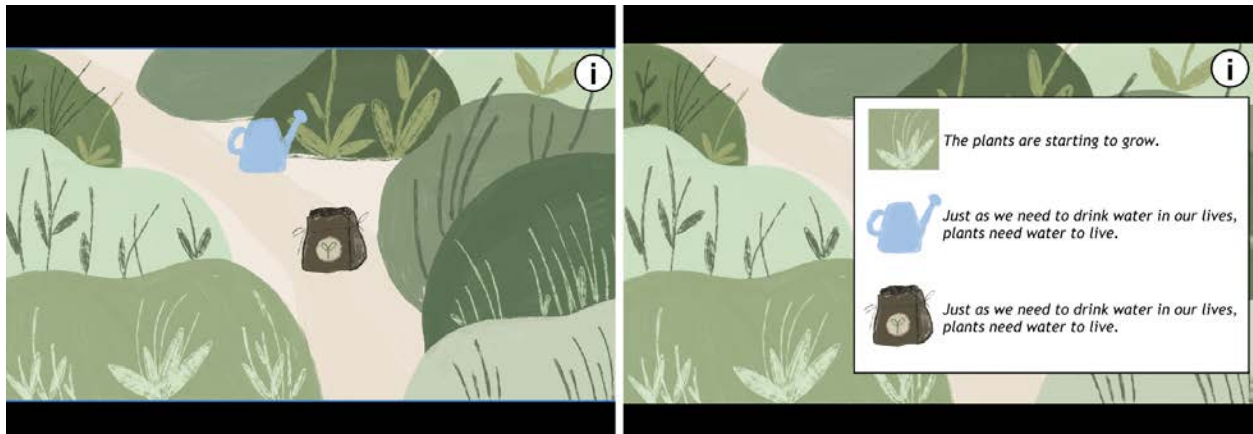

Figure 4.24. An example of final improvement

By clicking the button at the top right, the explanation page will pop up. This hint symbol is not required to be used. If children ask questions on an interface, parents can click to explain the story in more detail if needed. Alternatively, if parents feel that children need more detail at this point, they can click on the button themselves or guide children to click on it to open up the conversations of the topic. In this way, the parents' participation will definitely increase and the knowledge can be explained more fully. In the process of explaining, the communication between parents and children during the game is also sure to increase.

For the closure of the game, a closure page is added as shown in Figure 4.25.

Together you have experienced the life journey of plants and the little puppy. Maybe you felt sad in the process, maybe you learned more,, or maybe you still have a lot of doubts in your mind. Either way, hug each other tightly and talk about your feelings together!
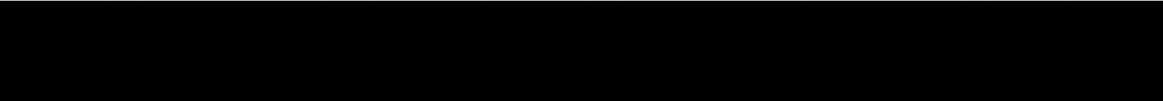
Figure 4.25. Closure page

The text on the closure page helps parents and children to return from play to life and to have some reflective conversations after the hug. In this way, parents are able to feel their emotions in a reflective dialogue and are able to enhance their communication with their children, whether it is about the science of death or the emotions associated with passing on love.

4.5.Final evaluation

The midterm evaluation was positive, most dilemmas are well improved. From the mid-term evaluation, the problems focus on insufficient parental involvement, inadequate communication between parents and children, lack of knowledgeable explanation and parents neglecting their own emotions in the process. The improvements to the design were informed by the suggestions made by the participants. The final evaluation aimed to see if these issues had been addressed. In the previous midterm evaluation, participants were asked to rate all the design characteristics, and as the greater majority of design characteristics received positive feedback. Therefore, only these problems were discussed in the final evaluation. Additionally, the participants were still free and entitled to share any thoughts.

The four groups participants were invited for the final evaluation. They were first told where changes had been made to the design and then began to try the game. After reading the foreword page, they started using the game again. They also clicked the hint buttons to check the information. In the end, they read the closure page.

Problem of insufficient parental involvement

Reading the foreword page takes two minutes in general and the action of reading the page conveys the parents' involvement in this game. Before, in real cases, children will take the screens from the beginning and start the game directly. But now, parents tell children that they need to read the text which is specifically for them. Children understand that parents will participate and take important roles in the process of the game. For the extra explanation page of knowledge, parents won't use all of them and only add some extra explanation when children don't pay enough attention to the interfaces and ask questions. Explaining the knowledge will also increase parental involvement.

Problem of inadequate communication between parents and children

Children play the game and parents will be aside. There can be physical interaction as children and parents can snuggle together in a comfortable position. Sometimes, parents will also point at and click the screen. Communication might be inadequate, especially for some not talkative parents and children. In the final evaluation, multiple participants mentioned that they played the game before so that they already knew the content of the game. Therefore, they were able to think about the knowledge in the game and explain the knowledge to their children. Even if there are no hint symbols in the game, they have more confidence to tell more. Parents can start explaining and talking whenever they would like to and the hint symbols help them to find better cut-in points to start talking naturally.

Problem of lack of knowledgeable explanation

Three groups participants said that after the midterm evaluation, they thought about the story in the game and for parents, the content in the game is not difficult to understand and explain. They can explain the knowledge better after trying the game and play the game with their children while knowing the story of the game. For parents, it is more important to try the game before letting children play for the first time. This is also written in the foreword page.

Problem of parents neglecting their own emotions in the process

This is the most difficult problem to solve, because when parents carry out activities to educate their children about death, it is very natural for them to focus on their children and ignore their own feelings because of their status as parents. The closure page asks

parents and children to embrace each other and talk about the game. In the final closing talk, participants would like to talk about their own feelings with children. Children should also know what parents feel during the process and in the user research phase, children can sense parents' emotional changes. By talking about the emotional changes clearly in words, parents can reflect on their own feelings and give themselves some attention.

In summary, the altered design enhances parental involvement in the play process and deepens communication with the child, while giving more attention to their own emotional changes that occur during the process.

As this was the second time the participants had played the game, they were able to feel more confident in delivering death education when they knew the content of the game and were able to explain in more detail the knowledge contained in the story.

Storyboard for user scenario

In the midterm and final evaluation of the design, the parents tried the game as participants. In practice, the children also play the game together as participants and in most cases the children are the ones who control the screen. We discussed practical use scenarios with parents and used storyboards to give brief descriptions (see in Figure 4.26).
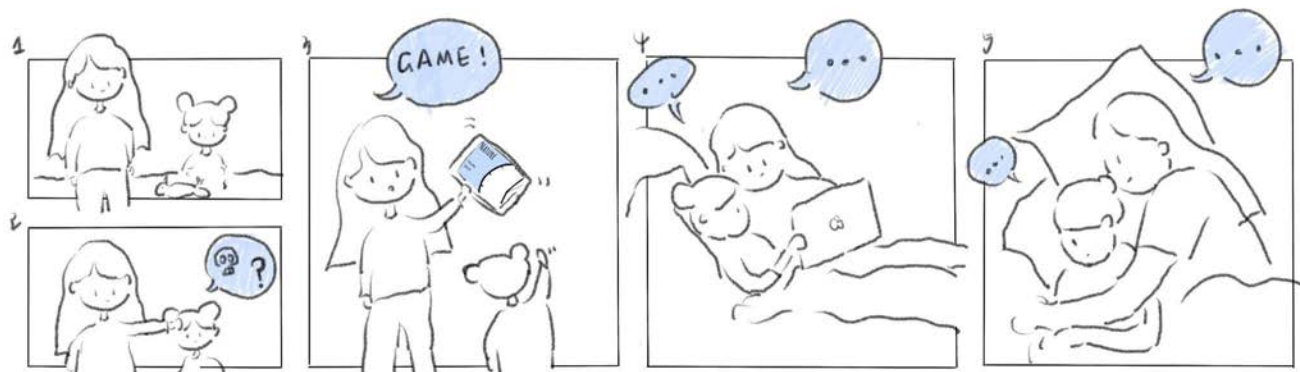
Figure 4.26. Storyboard for user scenario

Children may initiate questions about death. In addition, parents themselves may want to educate their children about death after seeing natural phenomena or messages. At this point, the parents can suggest playing the game with the children. The children are very receptive to the game and therefore want to play. Parents and children can play this game together in any environment and in a comfortable way and communicate in the process. After the game, parents and children can continue to interact and improve communication and emotional connection.

5. Discussion & conclusion

5.1. Discussion

5.1.1. Dilemma driven design

Death is a taboo subject and even when parents understand and are clear that it is important to educate children about death, it is difficult for them to draw out the needs and difficulties in this subject. In this project, dilemma drive design has been used to refine a complex abstract problem into different concrete problems. There are three main activities in the whole dilemma driven design process, which are 'discovery', 'definition', and 'application'.

Discovery & Definition

Discovery consists of identifying dilemmas. People frequently express their dilemmas in the form of mutually exclusive choices, especially when facing small, everyday problems (e.g., "Should I watch Netflix for relaxing or read books for learning?"). When a topic is easily touched upon in life, it is easy to think of what the dilemmas are. Due to the complexity and abstract nature of the topic in this project, it was difficult for participants to give clear answers even when being asked directly about what the dilemmas were. It is therefore important to use appropriate research methods so that the dilemma can be captured. Interviews were conducted in the project to get to know the participants' insights and among all the results, conflicting elements were found out to structure the dilemmas. Definition consists of analysing and prioritising dilemmas. Rephrased dilemmas define the design problems. The design direction has therefore changed from a broad approach of helping parents to better educate themselves about death to one of helping parents to better educate themselves about death by solving concrete practical problems.

Application

Application consists of generating ideas to address the selected dilemmas. In this project, dilemmas are defined and the goal is to solve the dilemmas. When designing to resolve dilemmas, as designers, we aim to eliminate the conflict by simultaneously fulfilling conflicting concerns. Addressing the dilemmas faced by parents was the guiding principle in the design process.

5.1.2.Always be clear about who we are designing for

Parents are involved in this project, as well as children. This therefore created a lot of confusion in the user research phase as well as in the design phase.

User research phase

The user research phase involved participants talking about their thoughts on death education as parents. In this project, the audience for death education is the children and therefore the performance and reactions of the children are addressed in the parents' conversations. However, the aim of the project was to help parents to better educate themselves about death, so the parents' own views on the topic were directly relevant to the final design during the user research process. By constantly reminding myself that parents were the audience for the design, the user research phase focused more on the difficulties faced by the parents themselves.

Design phase

In carrying out the design process, we realised that the final design is operated by the children as the first point of view. This is also reflected in the design products that already exist. The aforementioned building blocks for death education are more often played with by the children as the first point of view. Even if the children are the ones who operate the final design outcome, which is the game, the design is still inspired by the parents' own dilemma when confronted with the topic of death education. Thus, in the final design, the children are able to participate in a reasonable death education activity and gain knowledge in it, and such an outcome is only possible if it addresses the dilemmas that parents have when faced with death education.

When there are multiple audiences in a design, it is important to always be clear about who the design is for. This makes the entire user research and design process clearer and less confusing with intertwined messages.

5.1.3.Contribution

This project proposed using a dilemma-driven-design approach to define the practical problems that parents have when conducting death education for children and trigger potential design requirements which lead to a complete game design. The evaluation outcomes showed that a well-designed serious game helps parents conduct death education clearly in an interesting way and they stated that they wanted to use the game to educate children about death. There are two main contributions in this project regarding the design for a better death education experience: (1) applying a dilemma-driven-design approach to define the problems people have toward extreme

and vague topics; (2) introducing serious games as a way of conducting death education. By introducing dilemma-driven-design into the topic of death education, the issues behind the abstract and ambiguous subject of death are effectively extracted and used as a starting point for design. Serious games are a great way to complete death education because the educational purpose behind serious games is what death education is intended to achieve.

Make the problems of an extreme topic clear: dilemma-driven-design process

As one of the most extreme topics, death is not that easy to talk about. Parents realise the importance of conducting death education for their children and are eager to have some assistance while carrying out death education as not all the parents have the ability to explain death in a considerable way. As designers, we would like to offer help to target the problems. Firstly, we'd like to know more about their difficulties and needs. What difficulties do you have when talking about death to your children?What are your core needs toward death education? What are your expectations toward a good death education experience? From the interview experiences, those questions did not trigger clear answers because most answers were vague as to how this topic is.

However, as they shared their experiences and insights, the core problems which will help designers to see the design points are behind their answers. Dilemma-driven-design provides a framework to define the dilemmas parents experienced but didn't notice during death education activities by standing at a viewpoint of capturing the whole picture of the discovery stage. In summary, about death education, there are some practical concerns from the parents. Parents are doubtful about the ways of explaining. Besides, at what position should the parents be is also a big question that needs to be addressed.

Dilemma-driven-design keeps providing new ideas not only on addressing parents' dilemmas but also defining the design directions. For solving the dilemmas as much as possible, some certain design requirements need to be fulfilled and all the design requirements lead the design phase to be structured and clear.

An extensive space for design: serious games as the way of conducting death education

Death education is a very broad topic. Things developed for death education including children's picture books, films, playsets etc. often only focus on one or a few aspects of death education. Any attempt at death education is valuable, and striving to be able to cover more and more aspects of death education activities is the designer's design goal when faced with the many difficulties felt by parents in this topic. The game designed in this project provides a more explorative way for the children to comprehend the

meaning of death while keeping the parent still important in the whole process. The whole story is a simple simulation for the children to immerse and experience sadness and grief. For further modification, it is also easy for adding new elements into the game or changing the structure of the content. There are not many games designed with the aim of death education, at least for the type of games as *Nature.* Games are an easily acceptable and appealing way for children, as are games related to this theme.

5.1.4.Limitations & reflection for future work

Dilemma-driven-design is increasingly used in finding the conflicts of people's behaviours as a tool. The project explored how the designed serious game can be enriched by the outcomes of dilemma-driven-design to help parents conduct death education by addressing as many problems as possible. By inviting more parents whose children are on the preoperational and operational stage participating in the user research, a more comprehensive understanding of parenthood will be gained. In addition, the real interactions between parents and children playing the game should be recorded and analysed to be able to provide more reliable feedback to improve the game even furthur.

Too few participants

Leaving aside the widespread problems with the subject of death education, the issues presented through the user research may not be perceived as universal due to the small number of participants. In future work, more participants will be able to provide more rich samples for analysis.

Lack of expertise

Although references were made to the literature, published publications, etc., where possible, the lack of involvement of experts (e.g. psychologists or specialists in fields related to the science of death) in the analysis and design process was a major obstacle in the overall process. The content of the game is not extreme and the feedback from the participants in the evaluation session shows that they as parents do not feel uncomfortable or unsafe about exposing this content to their children. However, as the topic is rather extreme, in future work, if the content of the game can be checked from a professional point of view by experts in the field, the psychological safety of the children can be further ensured and the ethical and moral issues involved in the game will not be deviated.

No children direct participating

There are some reasons why there are no children getting involved in the whole process. First of all, most children cannot express this topic well at a young age. Second, the primary audience of the design will always be the parents as we are

addressing the parents' dilemmas and problems. In the user research phase, the children's behaviour and reactions to the topic can be expressed by the parents, and as the project focuses on the dilemmas faced by the parents, the absence of the children's direct participation in the user research has no impact on the results. However, in the scenario of a real situation, children will be the main characters who play and control the game. In future work, the evaluation phase of this game can involve the children. They complete the game together with their parents then their reactions to playing the game can be directly observed. The children's participation may help the designers to further improve the game so that parents and children can communicate more smoothly and connect more emotionally during the process, ultimately leading to better death education.

5.2. Conclusion

This research project started with a literature review which focuses on the broad concept of death education for children in a family-based environment and provides information on the importance of conducting death education for children. Knowing the importance of death education for children sets a firm foundation for this project. The development of children's ability to comprehend death requires clear explanations and supportive attitude from parents.

For knowing more about the needs of stakeholders, a series of interviews have been conducted as the main approach of user research. Results showed that the parents hold a positive attitude toward death education and had problems with conducting death education for their children.

Death is vague and so are the problems that parents face when carrying out death education. For analysing the interviews in a more clearer way, a dilemma-driven design approach has been introduced and used for addressing several practical problems: (1) how to provide the knowledge of death for children; (2) when and where to conduct death education; (3) emotion and attention during the death education process; (4) participation. The design practice starts with analysing design requirements. The design requirements help to structure the design with three aspects: (1) content; (2) format; (3) style. All the design requirements are triggered by the dilemmas defined previously. As a design approach, dilemmas-driven design takes an important role as a bridge between the initial problem and the final concrete design.

Based on the needs of parents and following the design requirements defined, the design explored the possibility of parents to conduct death education for children using a serious game where a complete story about life is shown and reflected. The content of

the game draws inspiration from well-known death education books or other mediums. The feedback from parents is positive and they are willing to use the game designed in this project as the tool to conduct death education if the content and style is acceptable for their children.

In the beginning of the project, four research questions were listed to achieve the main goal of the project. At the end of the project, all the research questions will be answered below.

RQ1. What is the importance of collaboratively exploring death education for the parents?

For answering RQ1, a thorough literature review of death education is conducted to gain more insights. Parents, as the closest ones to children, should take great responsibility to teach children about death because, in a family setting, death is common and is something that happens to everyone.

Education about death is an important component of fostering children's better emotional and cognitive development, teaching them how to deal with grief and reducing their risk of suicide.

RQ2. What are the dilemmas that have been identified by the participants?

With holding a positive attitude toward death education, parents still find it difficult. They cannot express the exact dilemmas as they are not used to address the difficulties by a dilemma-thinking. From the summary of the interviews, several dilemmas are defined as: (1) dilemmas of the way of explaining death (to be direct and honest or to be subtle); (2) dilemmas of focus of attention (to care children or to self-care); (3) dilemmas of when and where to conduct death education (to be flexible or to be prepared); (4) dilemmas of degree of perception (to protect or to observe); (4) dilemmas of extent of parental involvement (to lead or to accompany).

RQ3. How can the intended support be designed to meet the identified stakeholders' needs and solve the dilemmas of the participants from RQ1 and RQ2?

It is still a huge and vague picture after knowing the needs and dilemmas of the participants. By writing and categorising the design requirements, the big problem is addressed into small parts and goals. All the design requirements tend to fulfil the needs and solve the dilemmas. Different design requirements might trigger multiple ideas which won't work together and a platform or format which can fulfil as many design requirements as it can might be the feasible solution.

RQ4. How and to what extent does the support enable participants to collaboratively explore death education?

In the end, a serious game which tells a story about life is designed and tested by the participants. This game can be used as a tool for parents to use when teaching their children about death. This game allows children to have more participation and exploration so that parents won't only be the lead in the death activity. The game provides clear knowledge and information of death so that children can firstly comprehend death and then dealing with sorrow and still holding a positive attitude is also the goal. As a simple simulation, the game touches children by making them immerse into the story. The feedback from the participants shows that as parents they are willing to use the game as an aid to educate their children about death.

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Appendix

The game starts from the headpage (see in Figure a.1). The name of the game is *Nature* because death is the law of nature.

Figure a.1. Name page of the game

There are two buttons and users can start a new game by clicking the "new game". The button "chapters" is for selecting a specific chapter. (One more button "foreword to parents" is added and explained in the improvement chapter, see in Figure 4.22. In this appendix, the initial prototype will be explained so that we only keep the initial design features.)

If clicking on the button "new game", the game starts with the first step of selecting the profiles (see in Figure a.2).
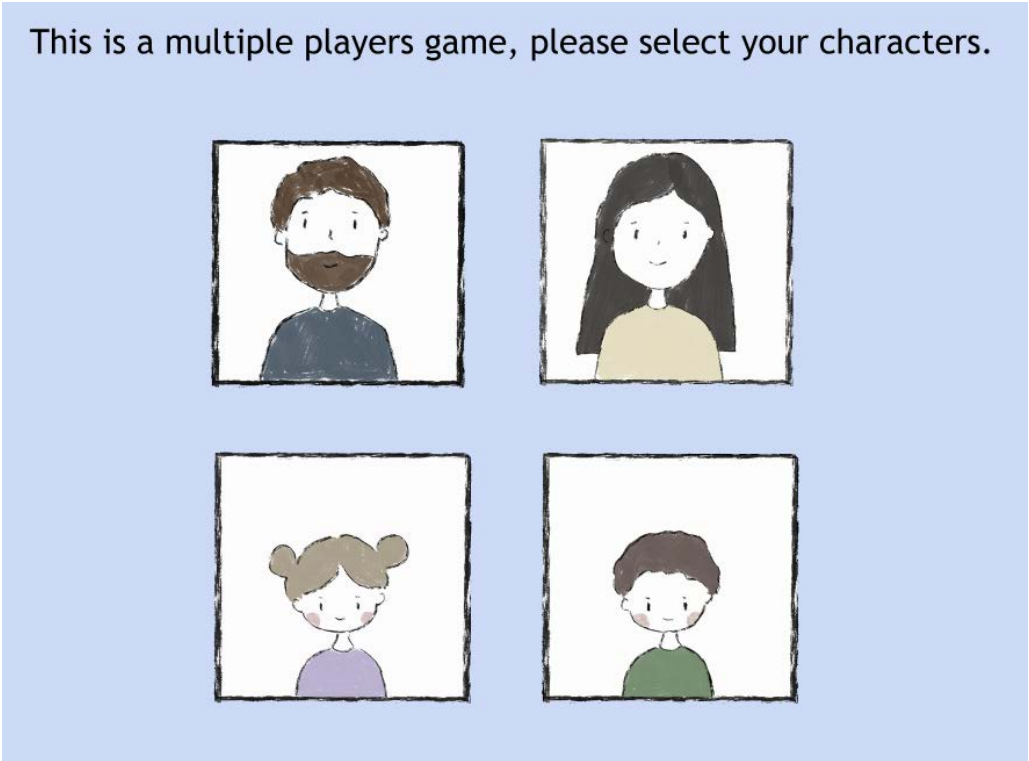
Figure a.2. Profile page for selecting

Only by selecting both parent(s) and child(children) profile(s), the game will start. This implies that death education should be a thing between parents and children.

There are 5 chapters in total and the first chapter is named "growth" (see in Figure a.3).

Figure a.3. Headpage of chapter 1

In this chapter children need to help grow the plants in the spring and will see the flowers bloom in the summer (see in Figure a.4 - a.10)

Figure a.4. The scene of the garden in Spring

[If you want to harvest flowers in your garden, then you need to be a good gardener.]
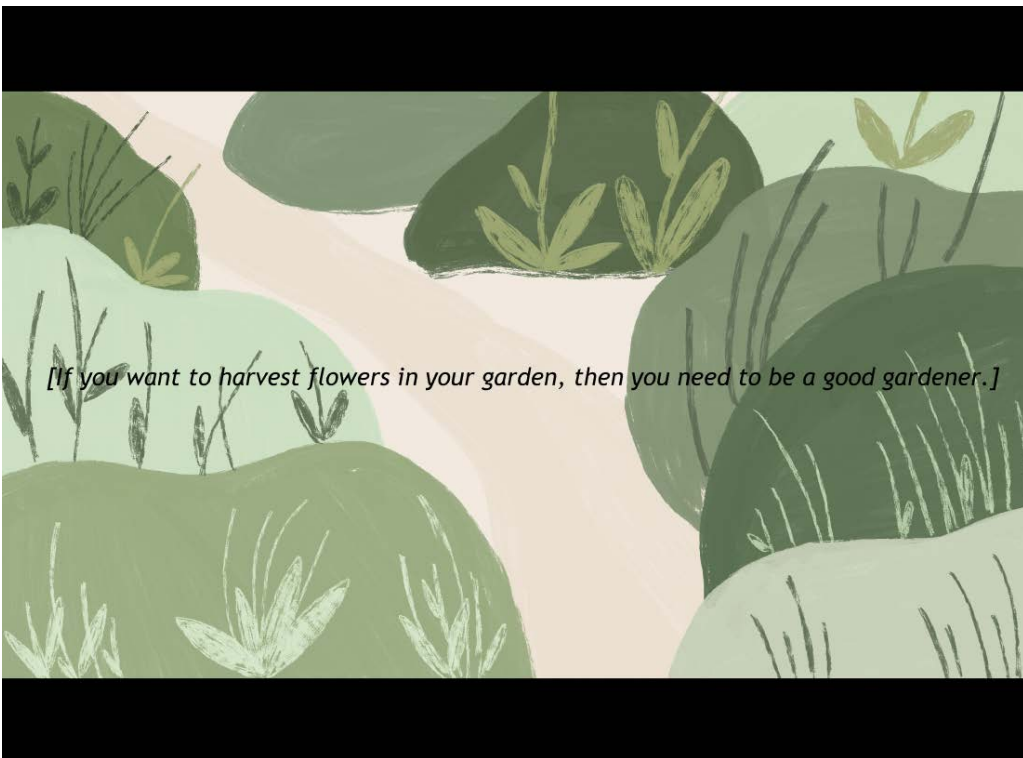
Figure a.5. The script page

The script shown in Figure a.5 is "if you want to harvest flowers in your garden, then you need to be a good gardener".
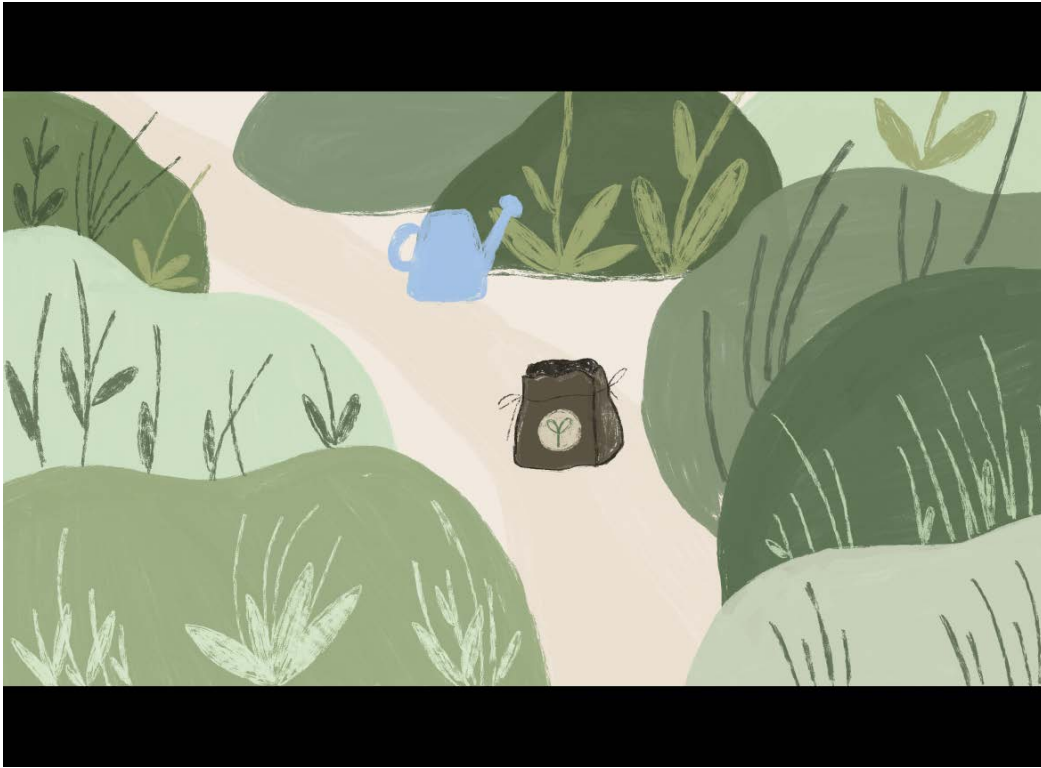
Figure a.6. Two tools for growing the plants

When children click on the watering can the plants will be watered (see in Figure a.7)and if clicking on the fertiliser bag, fertiliser will be put on the ground for the plants (see in Figure a.8).

Figure a.7. Watering the plants

Figure a.8. Fertilisation

After taking care of the plants, a script is shown on Figure a.9 as "Thank you for taking care of the little flowers. Enjoy the garden in the summer." Flowers bloom can be seen in Figure a.10.

[Thank you for taking care of the little flowers. Enjoy the garden in the summer.]
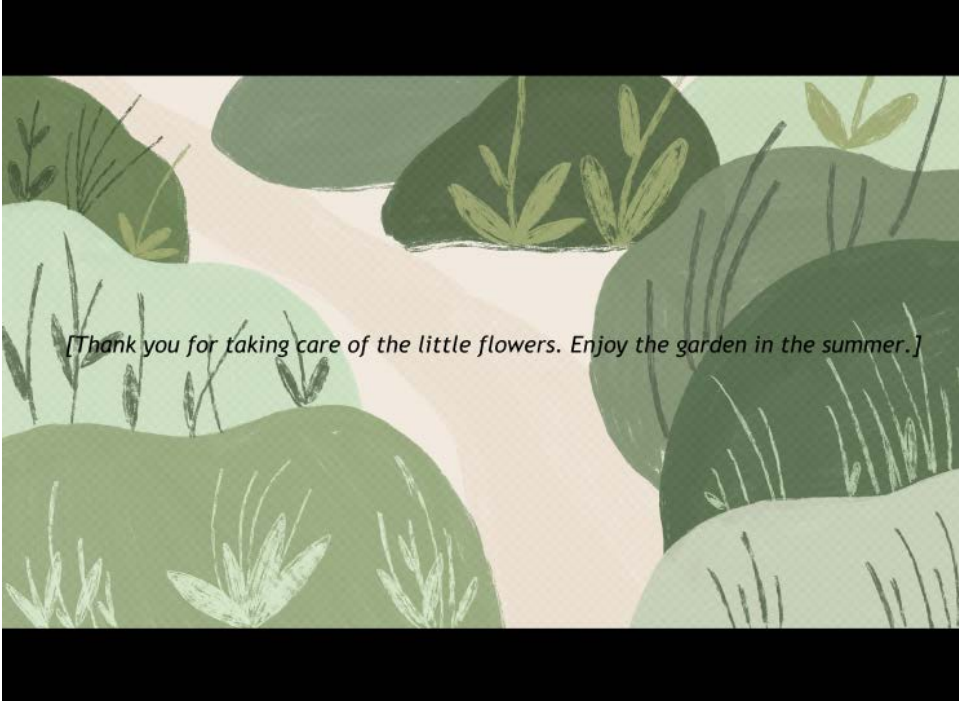
Figure a.9. Script page

Figure a.10. Flowers bloom

Children can take photos virtually in the game by clicking on the camera icon (see in Figure a.11) and a photo will be seen in Figure a.12. Chapter 1 ends here.
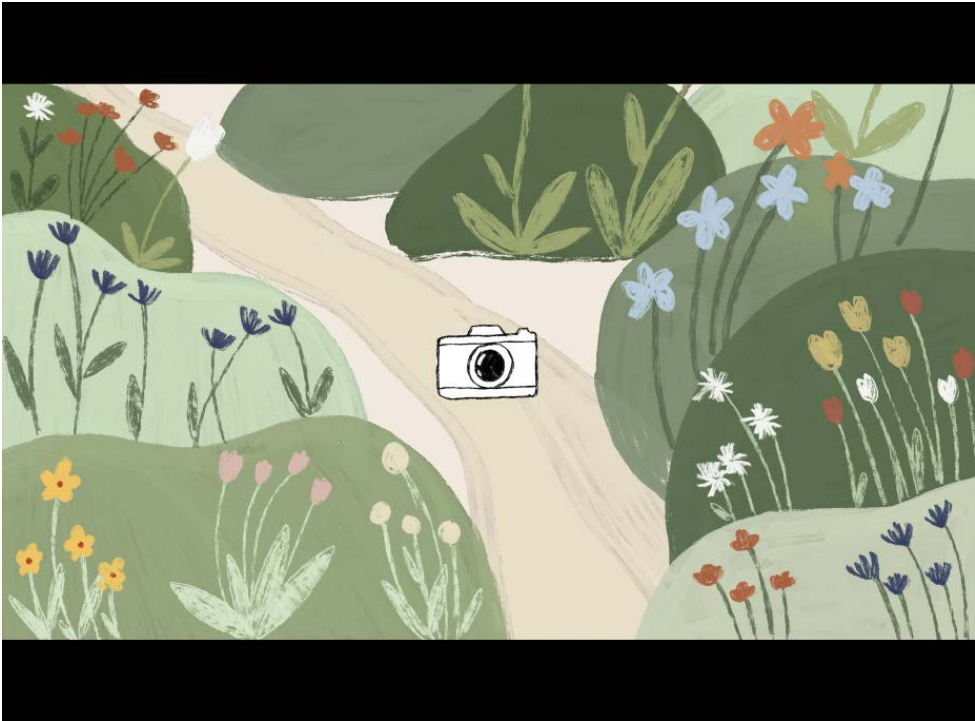
Figure a.11. Camera icon

Figure a.12. The photo of the summer garden

Chapter 2 starts with the name "the letter from Winter" (see in Figure a.13) because we want to guide the children to the garden again to see how it looks in the winter. By adding a setting of receiving a letter (see Figure a.14- Figure a.15) children will be guided to the garden.
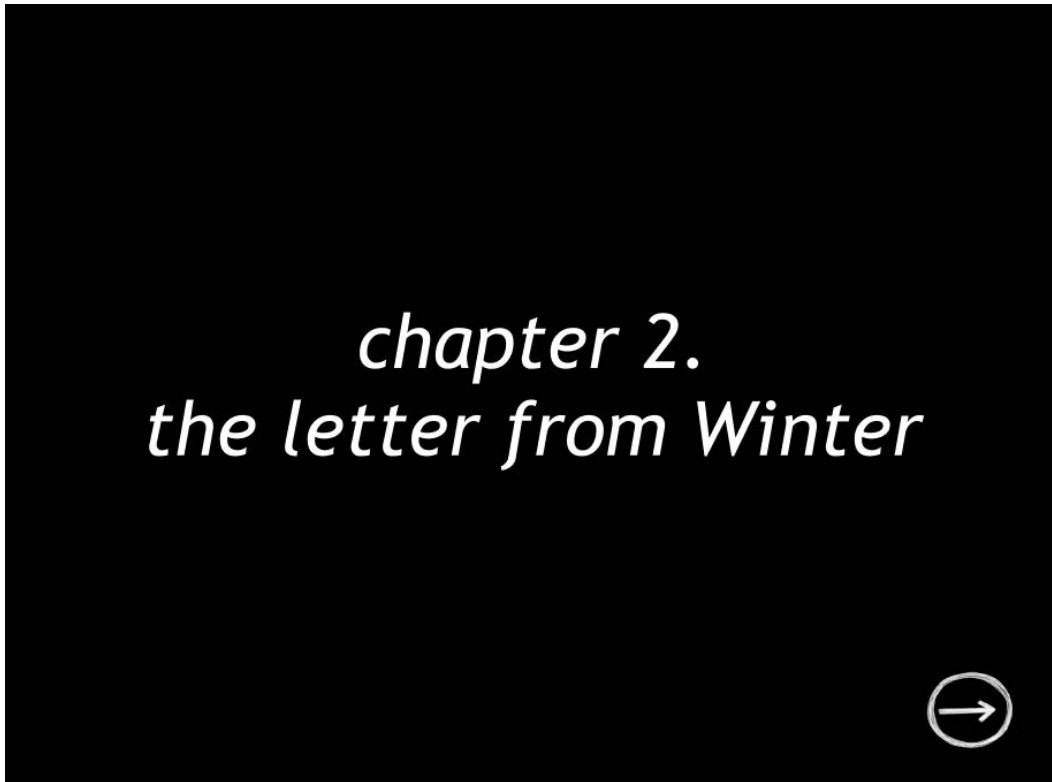
Figure a.13. Name page of chapter 2
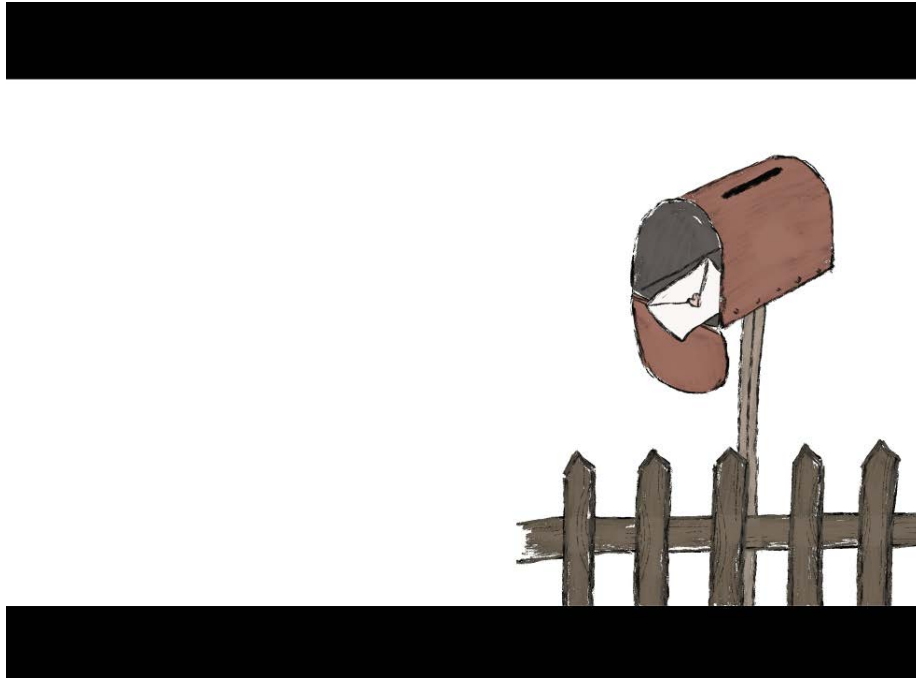
Figure a.14. Mailbox

Actually most of the clicking elements are gif format so that children will try to click on those elements. After clicking on the mailbox, a letter will be seen (see in Figure a.15).
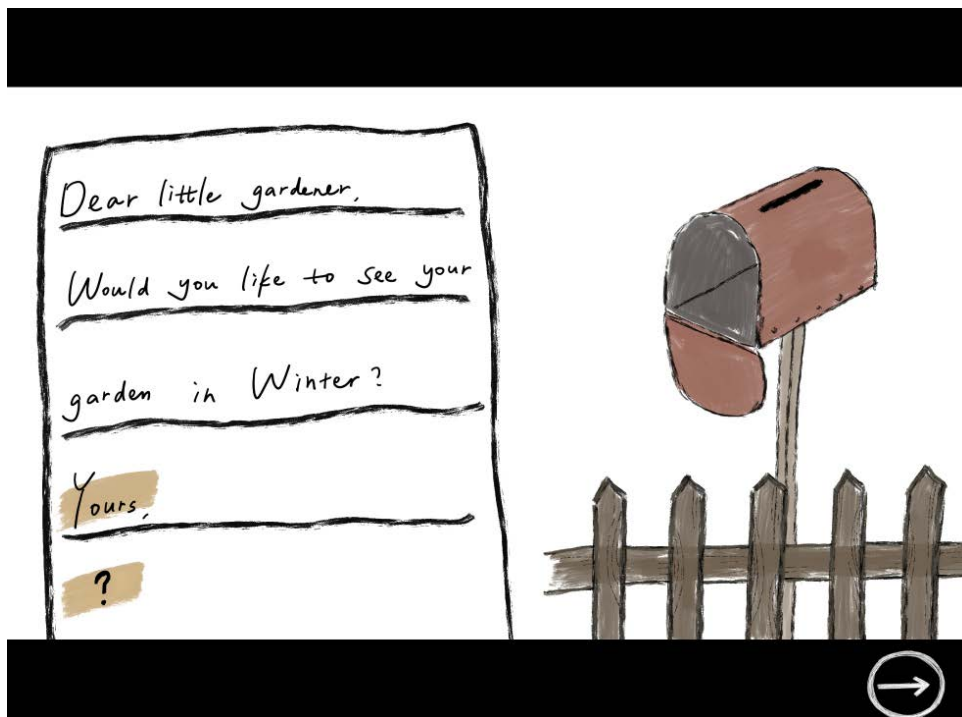
Figure a.15. Letter

Children will see there is nothing left in the Winter garden (see in Figure a.16).
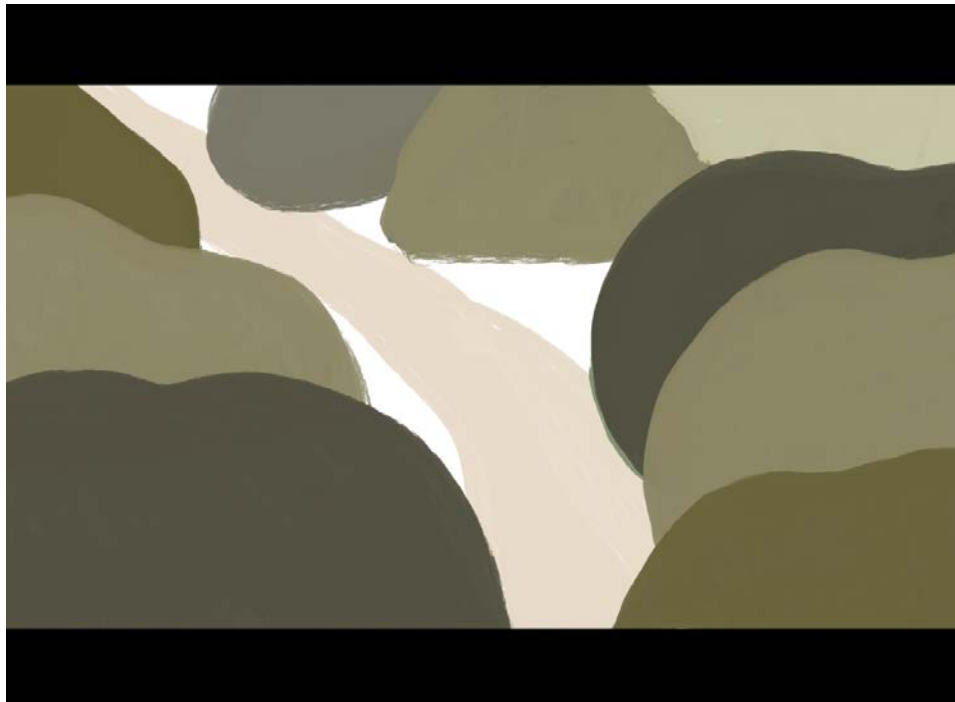
Figure a.16. Winter garden

Following is a page with scripts (see in Figure a.17).

[All the flowers were falling.]

[This is the law of nature.]

[You have seen beautiful blooms before.]

[The flowers will decay with the seasons.]

[But you are not left with nothing.]

Figure a.17. Script page

The script tells the truth that the falling of the flowers is the law of nature and the flowers decay with the seasons. Children will see seeds (see in Figure a.18) afterwards and that the whole circle of flowers' life.

Figure a.18. Seeds

As for how to take a photo before, here children can take a photo of the Winter garden again (see in Figure a.19 - a.20).

Figure a.19. Camera

Figure a.20. The photo of Winter garden

In the snow, a puppy will be found by clicking the moving part of the snow (see in Figure a.21- a.22) and that will lead to chapter 3.

Figure a.21. Something is moving in the snow
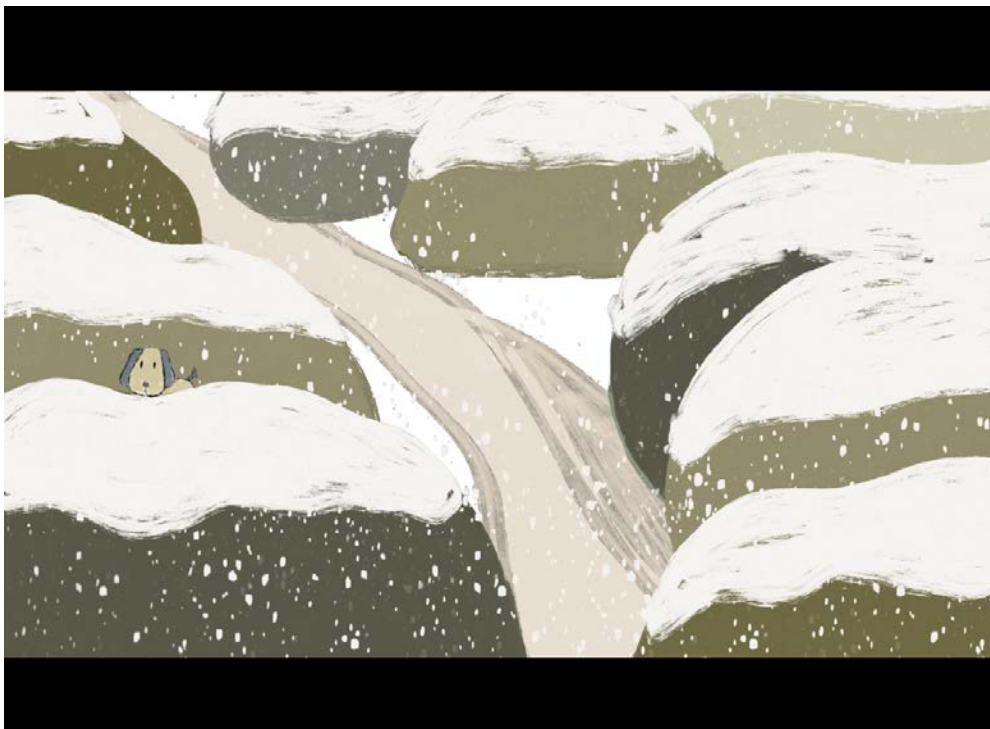
Figure a.22. A puppy

Chapter 3 starts with the name "companionship" (see in Figure a.23) and in this chapter, the connection with the puppy will be built by helping the puppy to grow and spend time together (see in Figure a.24- a.27).
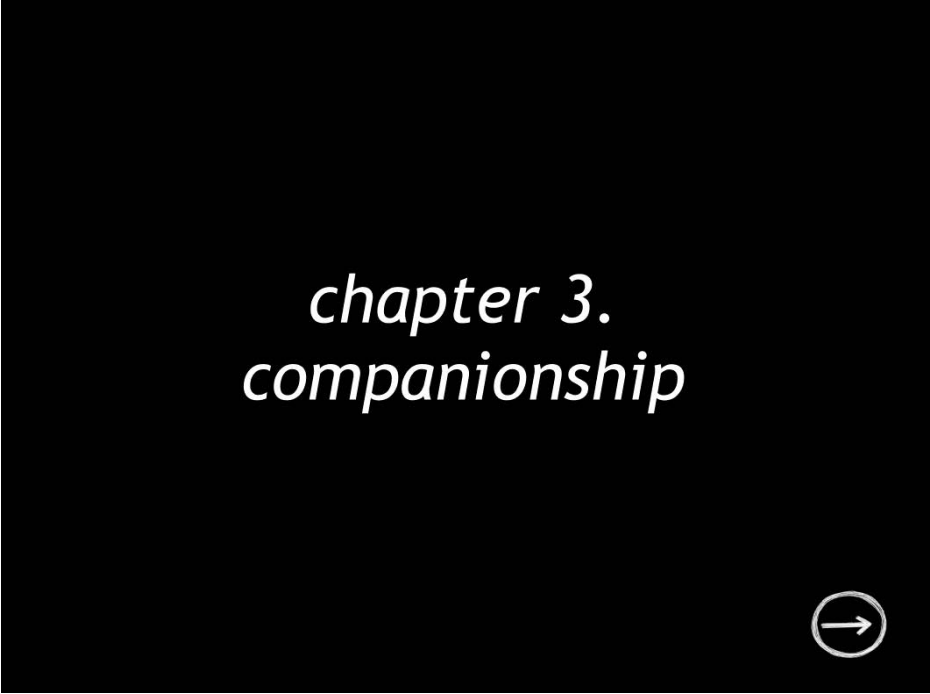
Figure a.23. Name page of chapter 3
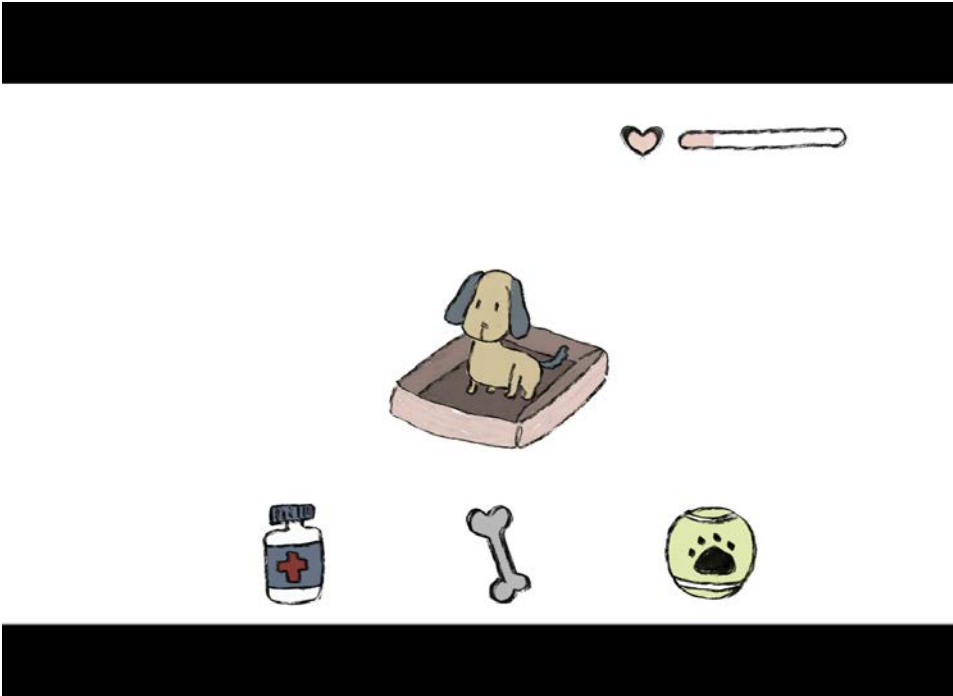
Figure a.24. Helping puppy to grow

By clicking on the elements on the bottom of Figure a.24, the puppy will get medicine treatment, food and also entertainment which is helpful for the puppy's health.

If clicking on the calendar icon on Figure a.25 there will be more and more photos of the puppy shown.

Figure a.25. Puppy's photos

The puppy runs every corner in the room (see in Figure a.26) and till one day the puppy doesn't run anymore (see in Figure a.27).

Figure a.26. Puppy' running everywhere at home

Figure a.27. Puppy lies on the floor

It is no use anymore to go to the pet clinic (see in Figure a.28) and the diagnosis states the death of the puppy (see in Figure a.29).
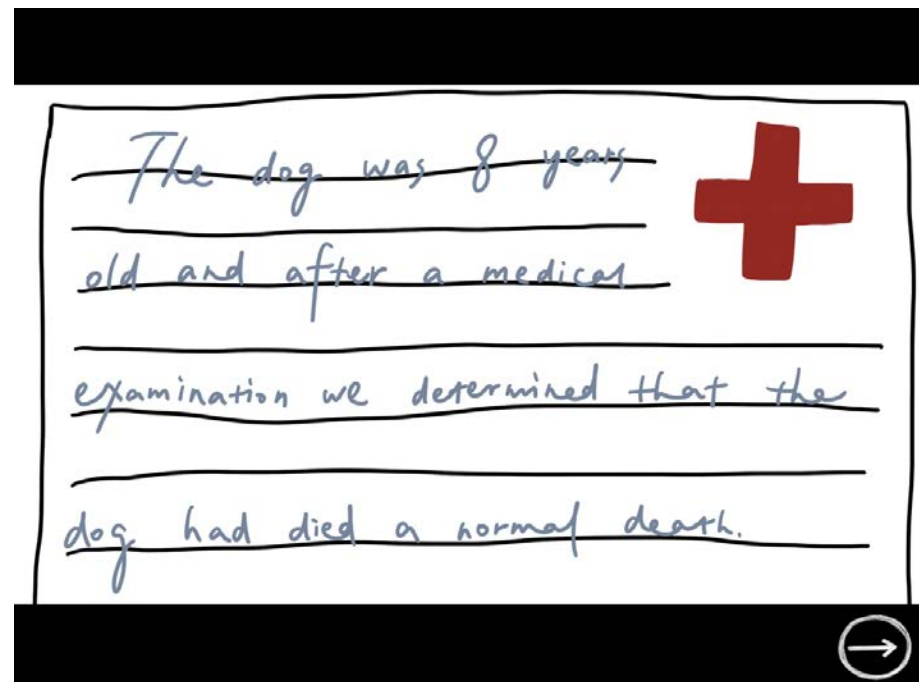
Figure a.28. Pet clinic

The dog was 8 years old and after a medical examination we determined that the dog had died a normal death.

Figure a.29. Diagnosis

This is the growth and death of the puppy. The next chapter starts with the name "farewell" and in this chapter a small funeral will be held (see in Figure a.30-1 and Figure a.30-2).

[It is time to say goodbye.]

Figure a.30-1. Bury the puppy
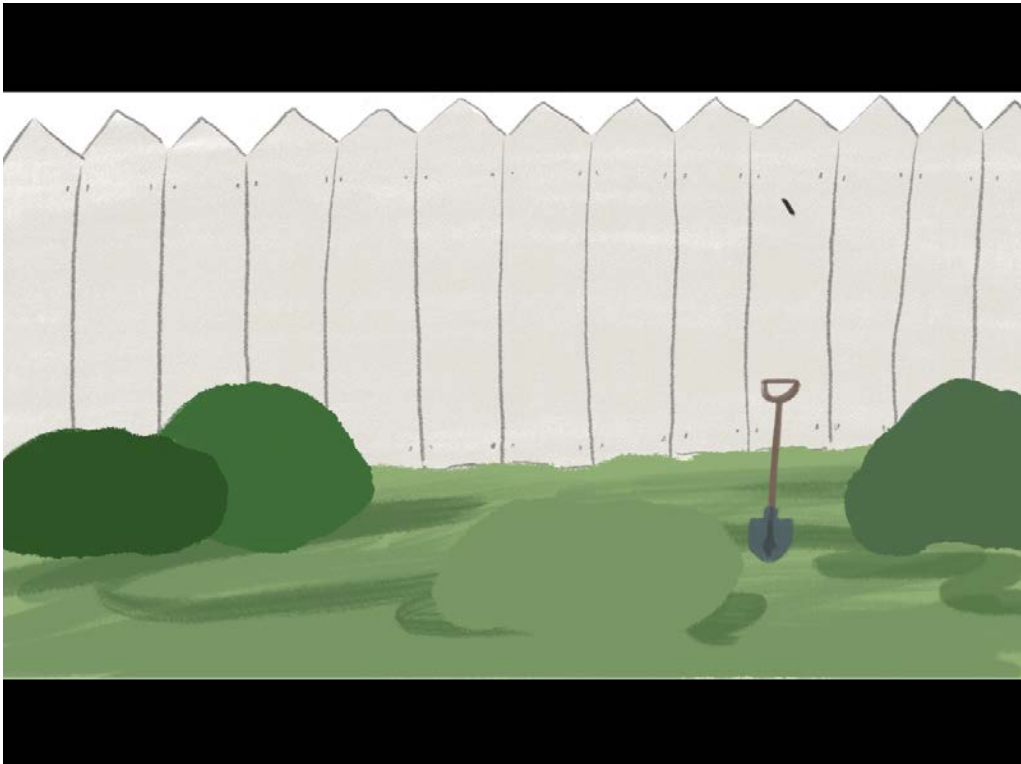
Figure a.30-2. Bury the puppy

After burying the puppy, in chapter 5 named "after farewell, love exists" (see in Figure a.31), all the photos will be collected in an album (see in Figure a.32).
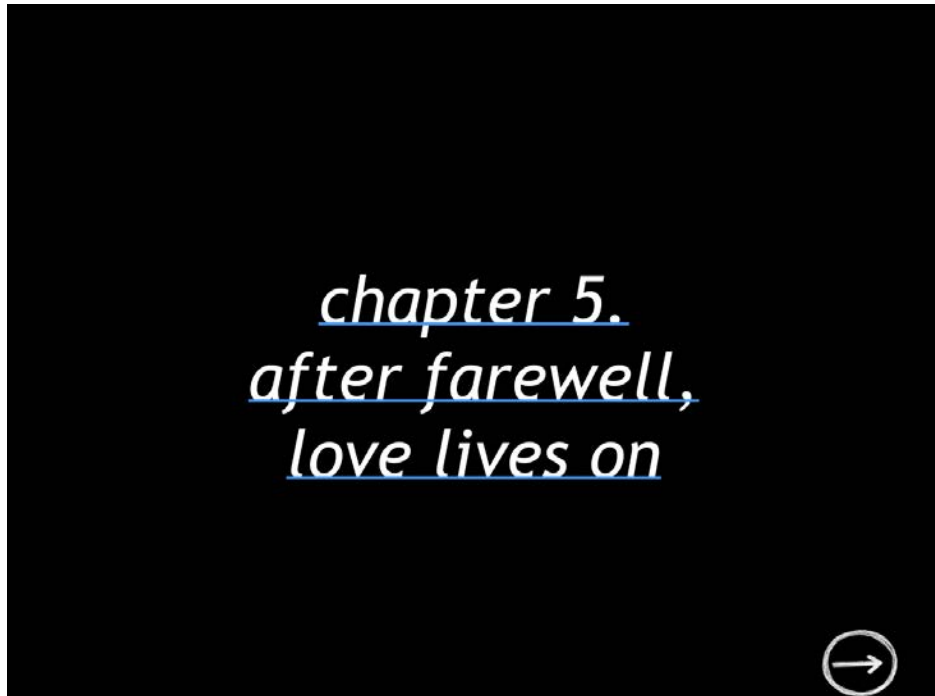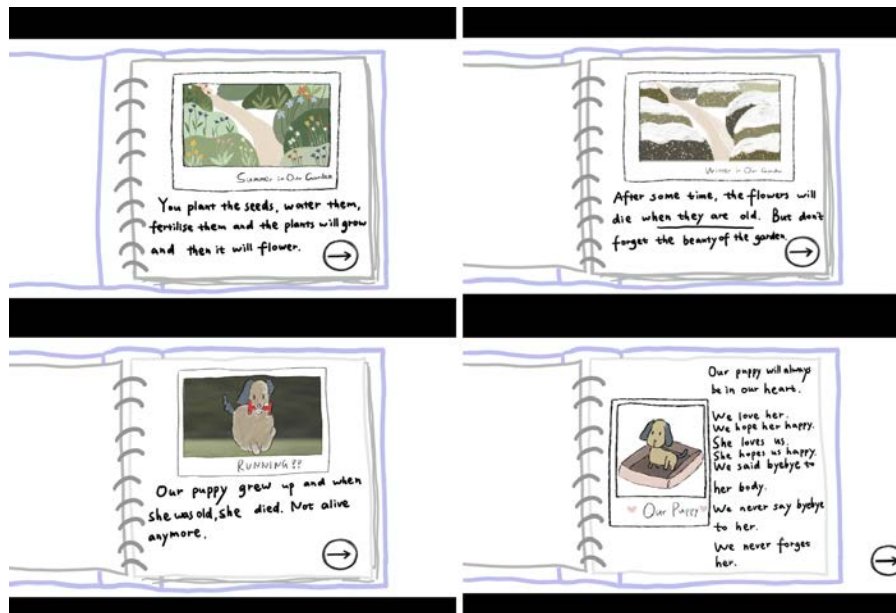

Figure a.31. Name page of chapter 5

Figure a.32. Photos in the album

The story closes with a beautiful image as many fairytale-vibe elements like the rainbow and the flowers are waving (see in Figure a.33).
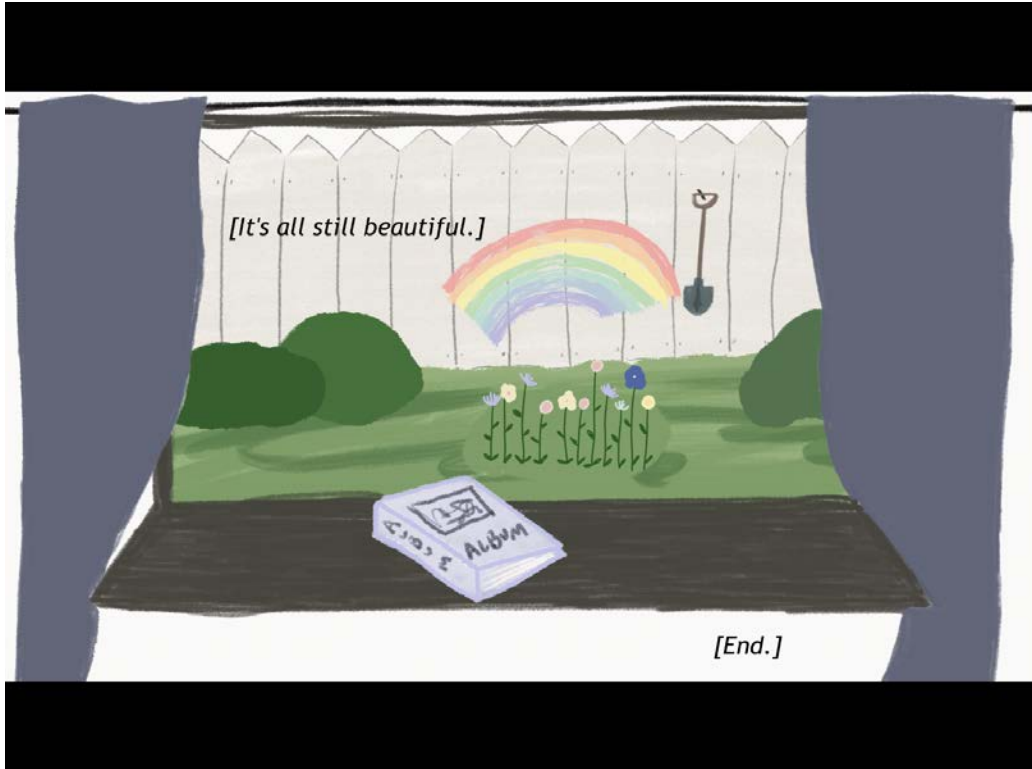
Figure a.33 End scene