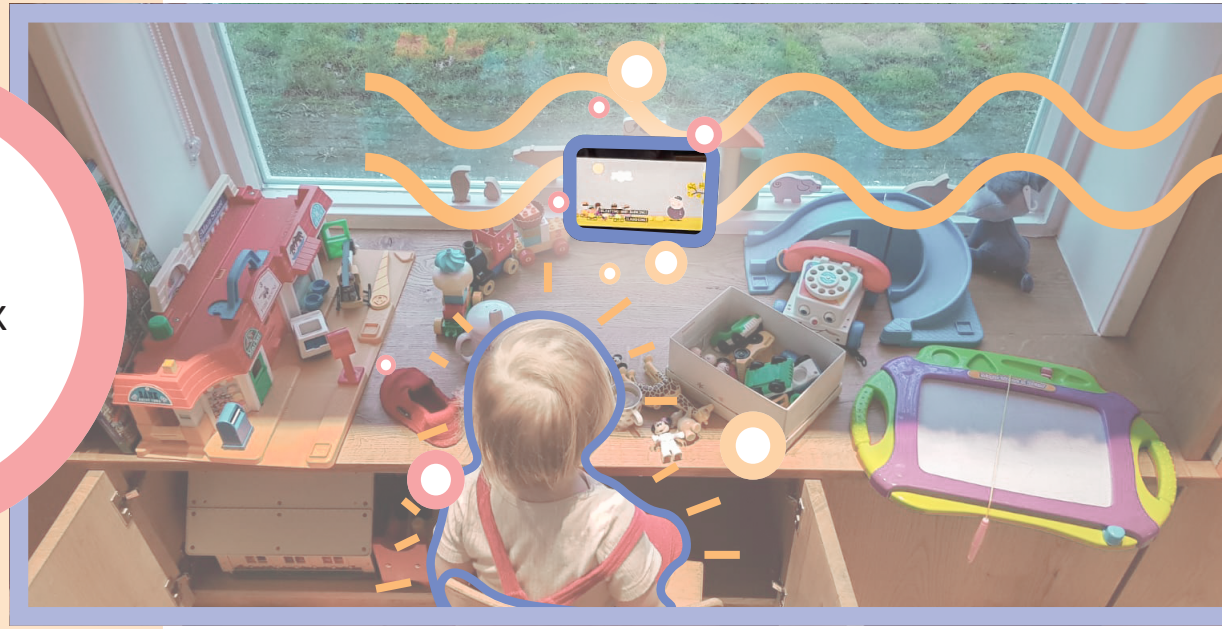
Edutainment for toddlers:

designing an episode builder for triggering response moments when watching TV

by
Tjitske Franx



Colophon

Edutainment for toddlers: designing an episode builder for triggering response moments when watching TV

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Preface

A little less than a half year ago, I started my thesis at the Play Well lab together with Pixifox Animation. I had the opportunity to take a peek into the world of making 3D animations, and I was amazed by all the creativity and the fun content that was created by the Pixifox Animation staff.

Two weeks within my project, the coronavirus took over the Netherlands, which took quite an impact on my project. Suddenly, I was only allowed to work from home, and all communication was done digitally, which is an entirely new way of working. I was challenged to quickly adjust the methods that I learned over the years into a digital form, from organizing context mapping sessions with users via WhatsApp video to doing online ideation session with my fellow lab mates. Unfortunately, Pixifox Animation had to leave the project due to the economic consequences of the coronavirus.

Graduation within these times was challenging, but also a one to remember. I learned a lot about myself personally and professionally, which I am thankful for. I want to give my special thanks to:

Mathieu, for helping me in setting up this project and guiding and supporting me transforming ideas and insights into practical and concrete formulations.

Margreet, for sharing your knowledge and guiding me throughout this project and teaching me how to present myself in the work field professionally.

My friends Sanne, Sterre en Jesse, for giving me study support during these times and keep me energized throughout this project by sharing fresh coffee and lots of walks.

My parents, for always having my back and giving me support throughout the project.

My fellow lab mates, for inspiring me with their ideas and participating in my ideation and testing sessions.

I wish you an inspiring and pleasurable read,

Tjitske Franx

Abstract

The aim of this thesis was to design an 'Episode Builder' toolkit which facilitates filmmakers to easily create a wide variety of episodes that all contain at least one educational response moment for 1.5-3-years-olds while meeting parents' concerns. Additionally, four different response moments were designed which trigger the child to actively engage with the content. These response moments were integrated within the toolkit's concept.

During the analysis phase, extensive literature studies and an interview with a pedagogue resulted in an overview of context-dependent design opportunities and threats that would affect the educational value of watching television, spread over the six core elements of the framework. Context mapping research with Dutch families found that it was most common that parents let their toddler watch TV when the parent requires his full attention on another activity during the day. However, parents are bothered that their child wasn't actively thinking about the presented content on television. Therefore, a design goal, an interaction vision and 18 design guidelines were formulated for creating educational and actively engaging episodes, which resulted in the design of four different response moments which a toddler can safely perform without the parent's supervision.

When evaluating Pixifox Animation's first storyboards, it was found that filmmakers integrated too many features within their storyboards which are too complicated for the viewer. Two design principles were formulated in which the toolkit should 1) facilitate filmmakers to explore essential features around a central theme, and integrate these features within their storyboard, and 2) fit the filmmaker's creative process. These design guidelines, and the integration of the response moments, resulted in the toolkit's final concept, consisting of five templates.

A validation study with 6 participants was set up to clarify whether the toolkit is able to facilitate filmmakers to create a great variety of educational storyboards around different central themes. In pairs of two, participants worked with five laminated paper templates to create an educational storyboard containing one response moment around a chosen theme.

The Episode Builder found to be able to facilitate filmmakers to create various educational storyboards which all include one response moment around different central themes. Participants had a clear idea about what the story's essence and learning goal should be, which a toddler can comprehend. However, some educational value was lost, since the toolkit failed to facilitate the participants to translate these features into visual shots which aren't overwhelming for the viewer. The activity was reviewed as insightful, probably easy to use after the first use, and somewhat repetitive.

Future tests should involve participants who are willing to the toolkit several times for four hours to validate if a 3-5 minute storyboard can be created within this timeframe and gain insight which types of themes can be explored with the toolkit.

Design explorations are recommended about how the toolkit can be introduced more efficiently, be more efficient in use when creativity isn't required, and how parent and child could reflect on the episode's content in other activities to elevate the educational value.

Table of contents

1 Introduction 8

1.1 Project context 10
1.2 Project stakeholders 12
1.3 Design challenges 13
1.4 Assignment 14
1.5 Project approach 16

2 Context research 16

2.1. Elements required for 'Learning through play' 18
2.2. The development of toddlers & how it affects the way how they are watching tv 20
2.3. The educational value of watching television: threats & opportunities 24
2.4. Results context mapping sessions 26
2.5. Triggering response moments among toddlers while watching TV 32
2.6. Creating episodes which are meaningful for toddlers 34
2.7. Design goal 40
2.8. Interaction vision 41
2.9. Design guidelines for creating an educational episode 42

3 Design response moments 44

3.1. Overall structure episode 46
3.2. Selection appropriate response types for response moment 48
3.3. Design response moments for pointing: Hide-and-Seek 50
3.4. Design response moments for one-word response: Uncovering the mystery object 52
3.5. Design response moments for one-word response: Yes-or-No game 54
3.6. Design response moments for one-word response: The helping hand 58

4 Design episode builder 62

4.1 Design guidelines episode builder 64
4.2 Conceptualization episode builder 65
4.3 The episode builder as a paper format 78

5 Testing 80

5.1 Test set up 82
5.2 Key insights 84
5.3 Evaluation episode builder 88

6 Conclusion 92

8.1 Conclusion 94
8.2 Discussion & recommendations 96
8.3 Personal reflection on project 100

Bibliography 102

A Appendix 104

A.1 Flyer for recruiting families for the context mapping sesion 106
A.2 Cultural probe booklet & materials 107
A.3 Results context mapping session 110
A.4 Parent's opinion about current tv shows 112
A.5 Analysis on dialogue speed of current toddler series 116
B.1Ideation 118
C.1 Testing different themes within the object circle 120
C.2 Vision of how a storyboard should look like 122
C.3 Templates shown on larger scale 124
D.1 Evaluation survey episode builder 139
D.2 Results evaluation survey episode builder 142
D.3 Results duration of the episode builder process & its 4-hour time predictions 143
D.4 Results storyboards 144
E.1 Project brief 150

1 Introduction

Introduction

In this chapter the project's context and stakeholders is introduced. From here design challenges and an assignment are formulated. The project approach's described that addresses these designchallenges and the different domains .

1.1 Project context

Screen time among children has increased over the past decade. In the Netherlands, a toddler of 2 years old spends 100 minutes per day behind screens on average, mostly watching tv and playing educational apps. Parents have various reasons to let their child use these kinds of media; most of them are related to when they don't have time to give their child their full attention. For example, they want to distract the child, so they have time to do some household related tasks or to have some time for themselves (P. Nikken, 2019).

Meanwhile, media use, especially among young children under two years old, has been under scrutiny over the past years. Watching television is supposedly a 'mindless' activity, which harms the child's development (Daniel R. Anderson & Hanson, 2010). Furthermore, parents have concerns that their children are confronted with 'bad' videos on YouTube (Satherley, 2017). This results in parents having mixed feelings when they put their child in front of a screen. When they do put their child in front of a screen, they make sure that the presented media is at least educational (P. Nikken, 2019).

Although concerns about the child's internet safety are valid, researches don't have a final ordeal whether electronic media benefits young children's development. Most research in this field focuses on the negative effects that electronic media can have on the child's development. At the same time, there is little attention to the positive effects media can have on the development of the child. This way, parents automatically only focus on the negative sides that media can have, without looking to the positive effects that media has to offer to the child (P. Nikken, 2019).

For instance, toddlers imitate the characters, sing along and dance, and answer questions during quasi-interactive moments within the series. Therefore, the overall conclusion is when developmentally appropriate educational content merges with entertainment content, children can benefit. (Anderson, 1998) However, real-life models (which involves play and adult-child interaction) are better teachers, then mediated models (like television). (Valkenburg & Piotrowski, 2017)

screen time

play time

Figure 1
Impression of how toddlers behave during screen- and play time

1.2 Project stakeholders

As made clear in the introduction, parents and toddlers are this project's main stakeholders. From a business and research perspective 'Pixifox Animation" and "Play Well Lab" are involved as project stakeholders as well. Each party will contribute to the project in a different way, which will be described within this section.

Figure 2
Logo Pixifox Animation

Figure 3
Logo Play Well Lab

Pixifox Animation

Pixifox Animation is a newly founded Dutch animation studio, that aims to establish itself as an independent, global, leading player within the 3D animation and entertainment industry, creating innovative and meaningful experiences around animations for families across the globe through streaming services, TV networks and theatres. Starting with animated stories for the 1-3 year-olds on YouTube as a launching platform, Pixifox Animation ultimately aims to offer content for broader audiences and expand to other domains (such as toys and games) based upon their series. There are a lot of successful children animations that 1-3-year-olds can watch online already. To gain a position on the market, Pixifox Animation wants to distinguish itself as a high-quality option. For instance, they could provide a meaningful and educational experience that fit the needs of the parents and toddlers in a way that has not been offered by competitors yet.

Currently, the series is still in its earliest development phase. Pixifox Animation wants to release 52 episodes of stories about a set of characters. Pixifox Animation wants to release one episode on YouTube every week, which is favourable for the YouTube algorithm and creates structure for children and parents. The videos will be 2.5 minutes long so the animation team is able to produce an episode within every week. Each episode will also contain at least one quasi-interactive moment, which will trigger a particular reaction from the child that will contribute to the child's development. Pixifox Animation aims to make these series such a success, that parents will buy the associated toy line for their kids as well.

Play Well lab

"Play well" research lab has just been founded within the faculty of Industrial Design of TU Delft. The core theme of this Delft Design Lab is children's flourishing in and through play. The lab explores and communicates the relation between the design of facilities for children's play and children's physical, mental and emotional flourishing. It researches and develops models, methods and techniques for designers to facilitate and stimulate flourishing in play, including opportunities for children to participate productively in the design of facilities for play. This graduation project with Pixifox Animation will be one of the first projects that can be a showcase on how design for children's play can impact children's cognitive, social-emotional and/or physical development positively.

1.3 Design challenges

Problem 1: Pixifox Animation aims to create an enjoyable and educational experience by integrating at least one "quasi-interactive moment" within every episode. However, how this moment can be designed to reach these goals is still unknown. To find out, this project should address the following issues:

- In order to contribute to the child's development, the animation should meet the child's developmental needs in an entertaining way. However, we lack insights about what these developmental needs for 1,5 to 3-year-olds are. Which leads to unclarity about **which product characteristics and (quasi-)interactions should be implemented within animation series to support the development of 1,5 to 3-year-olds.**
- Eventually, the parents are in charge what their child is going to watch. A wide variety of "educational" television series for young children does already exist. So **how can Pixifox Animation distinguish the educational experience around the animation for 1,5 to 3-year-olds from its competitors and how can this be communicated to the parents?** Furthermore, parents might have concerns about the harmful effects an innovative series could have on their child. **What experiences around animations are considered acceptable and safe by parents and which are not?**
- As mentioned in the introduction, the educational value of series is limited compared to real-life models, especially when children are watching these series alone. **How can we overcome these limitations and elevate the series' educational value by designing the series' content in a better way? And to what extent can we involve other parties, like including a parent or a toy?**

Problem 2: Pixifox Animation wants to create 52 episodes around 2.5 minutes long, which all contain at least one educational quasi-interactive moment. However, if the insights acquired from Problem 1 are presented in an incorrect form, we risk that the Pixifox-staff might oversee what is important or they won't become inspired to create a wide variety of educational episodes. So **how can we translate the acquired knowledge from Problem 1 into a more comprehensible and accessible form that the Pixifox-staff can use within their creative process?**

1.4 Assignment

In collaboration with Pixifox Animation and Play Well Lab, the following assignment is formulated:

*"Designing an **'episode builder'** which will **help filmmakers to easily create a wide variety of episodes** that all contain at least one **educational response moment** for toddlers (1-3-years-old), while **meeting parents' concerns.**"*

Figure 4 shows the scope of the project. The project will contain two types of designs, namely 1) the design of various educational response moments and 2) the design of the episode builder.

The design of each response moment should evoke some reaction from the toddler when watching television. The nature of the response moment should fit the abilities of the child and contributes to his development. Although the series should trigger a response moment without the help of merchandise, that doesn't mean that the ideation scope of the response moments should limit while watching television. Depending on what the Dutch family context allows, parents or the child's toys can be involved when selecting the episode, when watching television and/or when the episode is finished.

The episode builder is a set of tools which the filmmaker can use to brainstorm on a self-picked theme, perhaps from a theme list, and create an educational episode including a corresponding response moment around this selected theme. Since various response moments are designed, the filmmaker can choose which response moment fits the central theme best. The episode builder should be able to run multiple themes in the same way, so it filmmakers can easily create 52 different and exciting episodes.

The tools make sure that the filmmaker doesn't go overboard with embedding an endless amount of ideas around the theme within an episode. By using the episode builder tools, the filmmaker has structural support to create episodes which fit the level of complexity that the toddler can understand. During the process, the filmmaker should feel that he can still express his creativity.

Corona's influence on the project's stakeholders and assignment

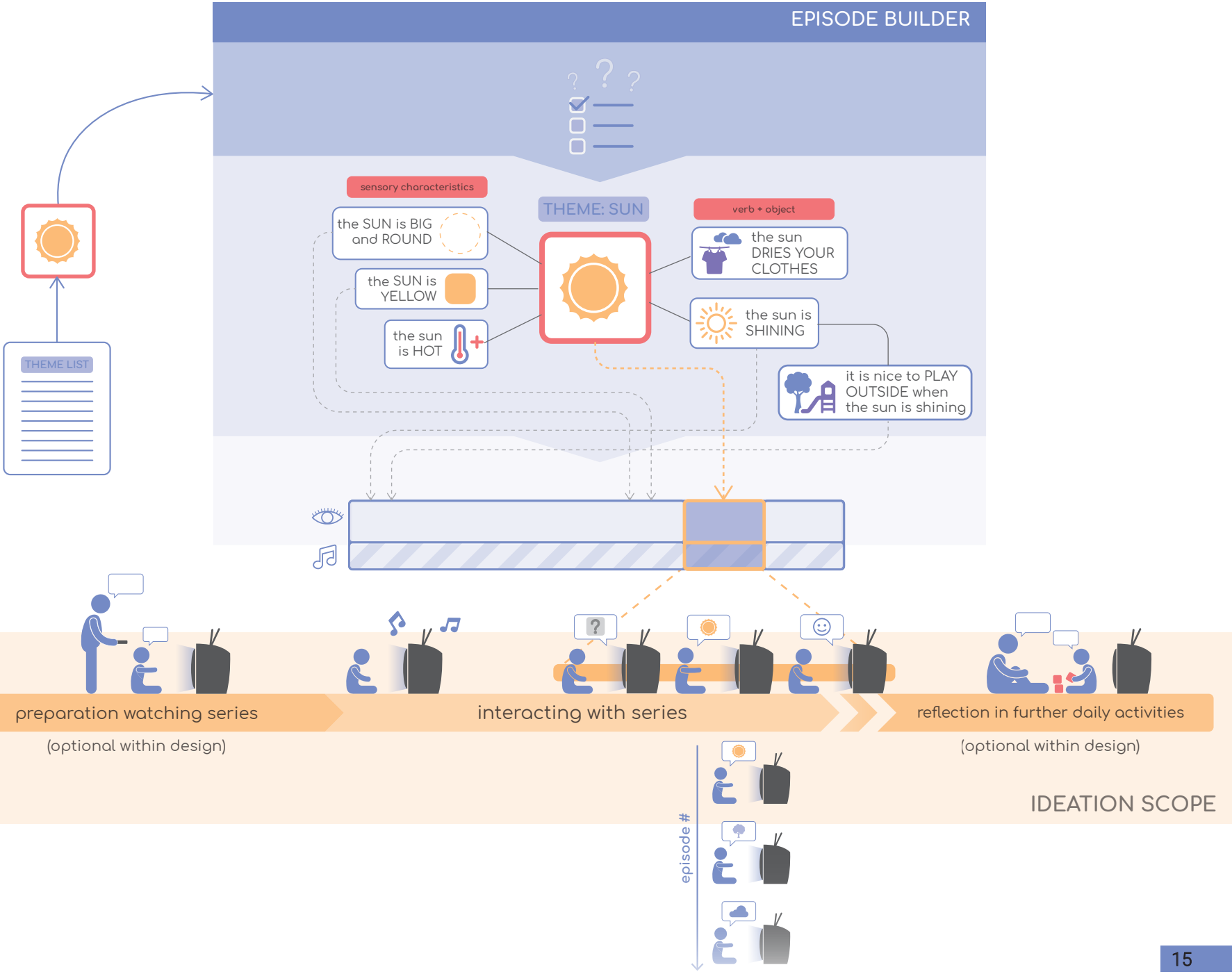
Due to the economic consequences of the coronavirus, Pixifox Animation, unfortunately, had to leave as a stakeholder during halfway of the project. This means that it was not possible to fit the episode builder to the Pixofox Animation process specifically since there was no animation team left to test with. Instead, Industrial Design students have validated the episode builder. Although the selected students had experience in making videos and/or designing for children, this results that the episode builder is suited to their knowledge base and way of working, which is different from the Pixifox Animation team.

Since the project was already halfway, the project's scope requirements which were set by Pixifox Animation will stay mainly the same. However, Pixifox Animation will not be named within this project from now on. The person who uses the episode builder will from now on be referred to as "filmmaker".

Figure 4 (right page)
Overview of the project's scope and how the design of the response moments and episode builder come together

DESIGN
EPISODE BUILDER

DESIGN
RESPONSE MOMENT



2 Context research

Introduction

This section explores the needs of the child and parents when it comes to watching educational series in Dutch family context. It will give answers to the following research questions:

- *How do 1-3-year-olds develop themselves and in what ways can the act of watching an ani-mated series contribute to this development?'*
- *How do 1-3-year-olds watch television in Dutch family contexts, and how should the series adapt to the child's and parents' needs?*

These research questions were investigated through a literature study, an interview with a pedagogue and context mapping session with the parents. Various design direction will be explored and evaluated. From the key findings, a design goal and requirements were developed about how the response moment should be designed. This section will serve as a stepping stone for designing the actual response moments.

2.1 Elements required for 'Learning through play'

In order to evaluate if a television series can contribute to the development of a 1-to-3-year-old, we need a framework (see Figure 5). Based on the work of Hirsh-Pasek and Zosh and colleagues, I created a framework about how to effectively stimulate development by using the principles of "learning through play".

First of all, each learning experience should have a clear learning goal (Hirsh-Pasek et al., 2015). It's therefore essential to know which learning goals are important to address for 1-3-year-olds, so these can be implemented within the animation series.

To reach this learning goal, there are five psychosocial pillars of learning which give conditions about how children can learn most effectively. These pillars are joy, meaningful, actively engaging, social interactive and iterative. Apps and television programs that recruit some or all of these pillars within a learning context are more likely to result in effective learning than those that do not (Hirsh-Pasek et al., 2015; Zosh et al., 2017).

It is important to note that to create a playful learning experience, the design should at least contain the elements of joy, meaningful and actively engaging. The pillars of iterative and social interactivity are not required but do increase the experience's educational value when involved (Zosh et al., 2017).

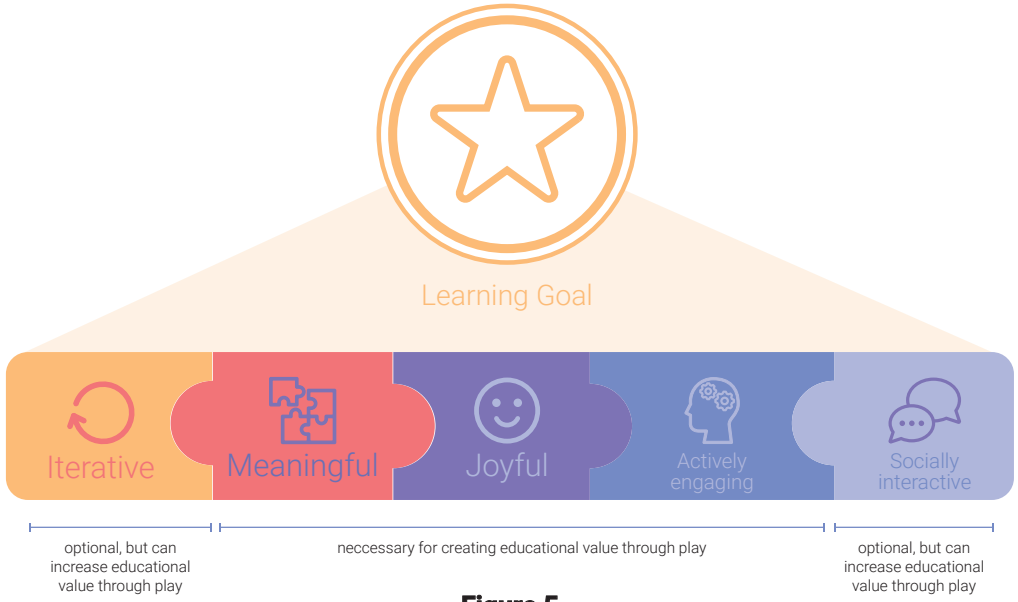


Figure 5
Schematic overview of elements which contribute to a playful learning experience

A playful learning experience is joyful

Play distinguishes itself from regular learning experiences since it is joyful. Therefore, joy is a necessary requirement for an experience to be playful - both enjoying a task for its own sake and the momentary thrill of surprise, insight, or success after overcoming challenges. Since joy is a great motivator, play can improve learning this way. Recent research shows how curiosity and positive experiences are linked to learning; for example, infants show more learning after a surprising event than after one that is expected. This doesn't mean that a playful learning experience can't contain neutral or negative emotions. Sometimes to let a child struggle in order to win a game, could lead to greater pleasure when the child actually wins the game. As long the negative emotions don't turn into frustration, you could use these emotions to your own benefit within your design (Zosh et al., 2017).

A playful learning experience is meaningful

Through play, children express and expand their understanding of their experiences (Zosh et al., 2017). Meaningful learning goes beyond simple memorization and occurs when children find the meaning in what they are learning and are able to not only connect new material to existing knowledge but expand their current knowledge to create new conceptual understanding (Hirsh-Pasek et al., 2015).

For example, when a two-year-old is asked to count to 10 and would directly say "1 2 3 4 5 6 7 8 9 10", parents think that their child can count. However, if five pieces of candy are laid in front of the child and were asked to count them, the child can't come up with an answer. The child rather just drilled a fact that they got to remember then understanding the true meaning of counting and how he can apply this concept in his world. A child needs to count actual objects, rather than reciting the count list without context (Zosh et al., 2017).

A playful learning experience is actively engaging:

During play, children become deeply involved and focused in such a way they become resistant to distractions. They make a self-directed effort for trying to achieve something. In this act, they are "minds-on", whether or not their bodies are active (Hirsh-Pasek et al., 2015). Children, therefore, play an active role in solving a problem rather than being explicitly instructed (Matte-Gagné et al., 2015; Zosh et al., 2013).

An excellent example to stimulate children into an actively engaging play-mode is shown in the study of Bonawitz and his colleagues (Bonawitz et al., 2011). In this study, two groups of children were given a novel toy with several hidden functions by their parent. In the first group, the parent taught them how the toy works by showing a limited number of those functions. The children tended to play only with those functions, while more functions were still there to explore. However, in the second group, the parent took a more the "unknowing" role by claiming not to know how the toy works and "accidentally" reveal one of the hidden functions. The children felt more part of the problem and tented to explore more widely and discover more of the hidden features of the toy on their own. features of the toy on their own.

A playful learning experience is iterative

Play and learning are not static. Since play provides an environment where it is safe to direct your own activities and experiment without risk, it encourages iterative and exploratory behaviour. Therefore, children can practice skills, try out possibilities, revise hypotheses and discover new challenges, leading to deeper learning (Zosh et al., 2017).

Take a situation where a toddler is trying different ways to build a high tower with blocks. After a few tries of stacking the blocks in different ways, he discovers that if you put the blocks as straight as possible on top of each other, the tower is less likely to fall, which permits him to continue building for a longer time.

A playful learning experience is socially interactive

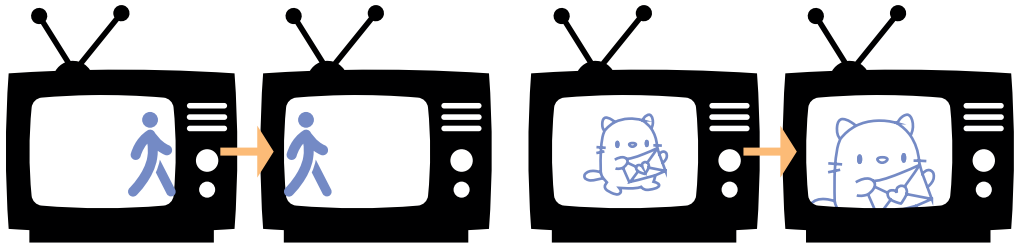
Although play and learning can happen when a child is on their own, the educational value of the experience can be increased if you involve high- quality social interaction. Play allows children to communicate ideas, from which they can get feedback from others or get new ideas in return which can expand new learning opportunities. Furthermore, socially interactive play can contribute to more powerful relationships (Zosh et al., 2017). A powerful way of how social interactions could lead to increased learning is through "scaffolding" from the work of Vygotsky (1987).

2.2 The development of toddlers & how it affects their way how they are watching tv

To determine what content is appropriate to show to 1.5- to 3-year olds, we need to define their needs and abilities. Through literature research and interview with an expert, a timeline is developed with the main developments on cognitive-, social-emotional, physical, and language level, ranging from birth to 3 years old. This timeline is shown in Figure 8. Eventually, general learning goals are derived on each level, which leads to a starting point for categorizing more specific learning goals.

Figure 6

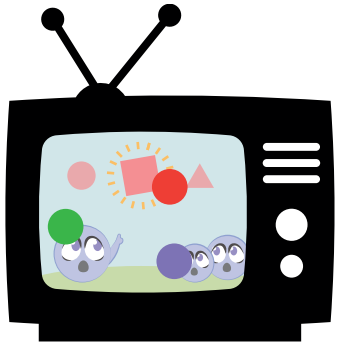
Confusing video transitions for young children



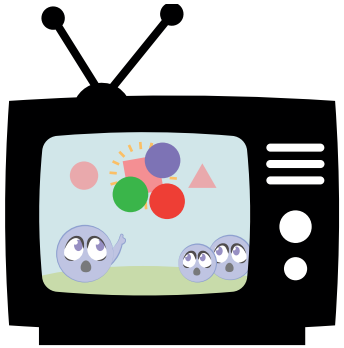
Children think that characters live in a small box called "television."

When children are nine months old, they will attempt to grasp, hit, pat, and rub objects on the screen. They see a 2D-object as an object which you can interact with instead as representation (Pierroutsakos & Troseth, 2003). Between 15 and 24 months old, children begin to understand how real objects differ functionally from representations. For example, you can see, hear, feel, smell and possibly taste a toy car, but you can only see and hear the pictorial representation of the car. Consequently, they begin to exhibit more appropriate behaviour, such as pointing to objects on screen (Barr et al., 2007). However, a 3-year-old still thinks that popcorn will fall out of a televised popcorn bowl when the TV turns upside down (Flavell et al., 1990). This is why many researchers believe that from the age of 18 months, children do understand that things represented on TV are different from objects in real-life, but they perceive 2D objects still as real . Toddlers think that these 2D characters and objects live in this tiny box called the "television". However, it's the glass barrier that prevents the child from interacting with them, which makes the child realize that these 2D characters and object are different from 3D objects.

Since toddlers have another understanding of what watching television is, they also have another understanding of the mechanics of storytelling that TV often uses (Courage & Howe, 2010). Characters come and go within on-screen in a way that they cannot happen in the real world, through visual transition techniques like cuts, zooms, pans, wipes, pans and fades (see Figure 6). For example, it is not logical for a toddler to watch a character walking out on the right side of the screen and then suddenly appears on the left side of the screen. Only at the age of 2, children start to understand the visual transition between successive shots (Daniel R. Anderson & Hanson, 2010), but this ability is still limited. Therefore visual representations should match the way how events are represented in real space as much as possible, and the use of visual transitions between successive shots should only be used when really



Eye gazes of three 1-year-olds



Eye gazes of three 1.5-year-olds

Figure 7
Representation in differences how a 1-year-old child focus his attention at the screen compared to a 1.5-year-old child

Attention differences: where to look at the screen?

Toddlers are still learning where they need to watch on screen, which video creators might not realize. This is because their attention networks are still under development at this age. In the first six months of the child's life, alerting and orienting networks start to develop and mature rapidly. These networks are responsible for guiding the direction of attention and the selection of targets (see Figure 8). Children will focus their attention on everything that moves or makes noise. Until they are 18 months old, a child's attention is guided through formal features when they are watching television, like bright colours and fast-moving objects . There is no common eye pattern among individuals within this age group when they watch the same video, so designing a video which guides their attention to the learning element on-screen seems therefore not possible. Furthermore, children's attention span is short, and they only look 10% of the whole episode at the screen. In the meantime, they continue playing with their toys. Children at this age appear not to have much interest in watching television, although they can be amazed by its dazzling features shown on screen.

When children become 18 months old, their attention shift more towards salient features, such as the dialogue between characters . This is probably due that their vocabulary has increased compared to several months ago (see Figure 8), so they can understand the narrative better. They start to enjoy the narrative, and they especially like videos with songs which accompanies dance so that they can mimic them. Their interest in watching television and their attention span increases with experience . Starting from 2 years old, their executive networks of voluntary control of their attention starts to develop. This means that they can willingly put their focus on one task without always being distracted by one small movement or noise (see figure 7). However, unnecessary movements or quickly moving from the point of attention should still be avoided within videos. Only when the child actually pays attention to the tv's content, the designer is able to communicate an educational message to the child.

Adjusting target group: 1.5-3-year-olds

Scientists are in understanding that children younger than 18 months are very unlikely to learn from watching television. This is due to the fact that children that age don't understand visual transitions between successive shots let alone narrative. Furthermore, they pay little attention to television overall. When children that age do pay attention, their point of focus on screen is quite random, and they are not interested in the narrative. Also, the developmental differences between 1-1.5-year-olds and 1,5-3-year-olds seem too big to put them together into one target group. Therefore, the target group will be changed into toddlers who are between 1.5 and 3 years old. Which, in conclusion, changes the assignment in the following way:

*"Designing an **'episode builder'** which will **help filmmakers** to easily create a wide variety of episodes that all contain at least one **educational response moment** for toddlers (1.5-3-years-old),while meeting parents' concerns."*

Learning goals related to motor development

From the age of 1, children get more mobile. They will start to explore their surroundings by crawling and already can set their first steps alone when they are 15 months old. Between the 18 and 36 months, children continue to develop their gross and fine motor skills, by learning new movements and practice them over and over, so they become more fluid and stable. They will learn running, jumping, squatting, walking sideways and backwards. Since all these movements are new for them, toddlers find joy in practising these movements in play, also known as motor play. Motor play involves pulling and pushing carts, playing tag, dancing, and so on.

Furthermore, children will also refine their fine motor skills, like improving their pen grip when holding a crayon during drawing—or being able to pick up smaller and smaller puzzle pieces.

Being able to control your movement stimulates a sense of autonomy, which is also advised to be stimulated by the Nederland Jeugd Instituut.

Learning goals related to cognitive development

When children become 18 months old, they develop the ability to visualize objects within their head without actually seeing them. This is called symbolic thought. From this moment, children can involve themselves with symbolic play and starts pretending daily events like feeding the doll. This way, they can make sense of what they see in the world. They start linking what several objects are and what they can do. For example, a cat miaows, or the sun is yellow.

Also, their language takes a massive leap between the 1,5 and 3 years old. Between the age of 2 and 4, the Nederland Jeugd Instituut (Meij & Ince, 2013) advises parents to stimulate their child learning representational skills, like shapes, colours, words and counting. Representational skills are involved in understanding people, objects, and events in terms of mental representation, including the use of images and words.

Learning goals re;ated to social-emotional development

From the age of 18 months, children reach a stage that they know that they can trust the world around them. With this knowledge, they create the need to explore the world by himself, but still want help from his parents from time to time. Young toddlers don't know how to express and handle their emotions yet. Once something doesn't go as the way they planned, they will throw tantrums, which could be challenging to handle as a parent. At this age, they can only think from their point of view, so they can't reflect on how their actions might affect the feeling of others. Sharing toys with peers is, therefore, a difficult task, and children will mainly play solitary until they reach the age of three. When they reach the age of 30 months, they start play parallel from each other, but each with their own toys. When they hit the age of 3 years old, children are interested in playing together. To prepare children for let them playing together, Nederlands Jeugd Instituut (Meij & Ince, 2013) advises parent to stimulate their 2-year-old skills that help him being able to get along with his peers in a constructive way, and prevent to be continuously in conflict or secluded from them.

Despite not having the skills yet to regulate their emotions and play with others, toddlers are quite social. They are eager to help others. Also, due to the increase in their cognitive skills, they slowly learn general knowledge about the world. For example, what you can buy in the supermarket. However, they can still be scared of new situations, like going to the dentist. Nederlands Jeugd Institute (Meij & Ince, 2013) therefore advises parents to stimulate their 2-4-year old to learn and maintain the social rules and skills that enable the child to live easily with other members of the community.

Main insights

- Since children younger than 18 months can't learn from television, the target group of this project is adjusted to 1.5-3-year-olds.
- Transitions between succesive shots should be minimalized throughout the series.
- Since toddlers have a limited attention span, each episode should be around 5 mintutes. Furthermore unnecessary motions and changing often from the point of attention should both be avoided.
- On motor level, the series could teach the child about gaining control about their gross and fine motor movements.
- On cognitive level, the series could teach teh child about representational skills, like shapes, colours, words and counting
- On social-emotional level, the series could teach the child about skills that help him being able to get along with his peers in a constructive way, and prevent to be continuously in conflict or secluded from them. And about the the social rules and skills that enable the child to live easily with other members of the community

Figure 8 (right page)

Timeline developmental changes child between birth and 3 years old

can learn from television

cognitive

- The alerting and orienting networks that guide the **direction of attention and the selection of targets** are the earliest to develop and mature rapidly over the first 6 months. Children will focus their attention on everything that moves or makes noise. Their attention is therefore quite random

- Understand "No", "Show me" and "look"
- **Point and look where others point**, which implies some understanding of how others see and think

- Can **visualize objects in their heads**, also when the object isn't present, which skill can be used in problem solving
- Being able to **repeat imitations or words** they learned several days before
- **Obey simple intstructions** such as "Shut the door" and **respond to simple questions** such as "Where's the cat?"

- The **executive networks of voluntary control of attention** that is needed to adapt to the demands of particular situations starts to slowely advance
- Are still egocentric, but starts to **understand things from another's point of view**
- Are beginning to **understand the consequences of their own actions and those of others**, for example when something falls over or breaks

- **Video deficit slowly disappears**: they start to understand that things shown on television are just representations of the "real world"

social-emotional

- Expresses the **six basic emotions**: interest, joy, surprise, anger, sadness, disgust, and fear
- **Recognises an emotion in other people** and imitate that feeling, but that doesn't mean that they are actually feeling that emotion

- **Social referencing**: start intepreting the meaning of situations, objects and/or people by using another's emotional expressions and tone of voice as a source of information

- Are eager to be **independent** ("me do it!")
- Begins to have **tantrums** when things don't go his way
- Enjoy trying to sing as well as listening to **songs and rhymes**
- Grows **interest in dialogue** between characters on tv

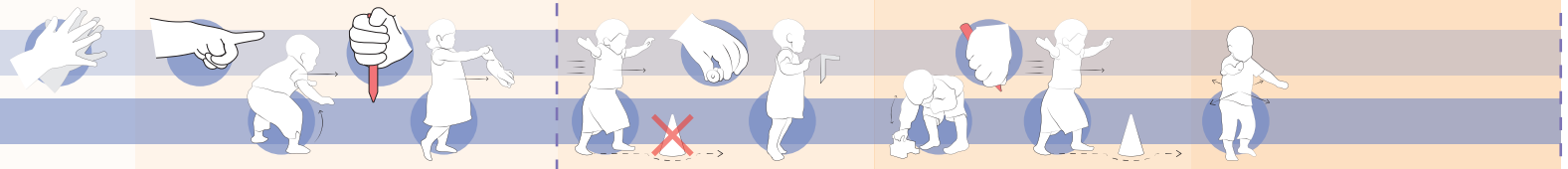
- Are **impulsive and curious** about their environment and are eager to try out new experiences
- Likes to **help others** & want to **share songs, conversations and rhymes**
- Start to **express how they feel** & can divide emotions into two broad categories - feeling good or feeling bad.

- Interest grows to **play more with other children**, but they don't want to share toys with them

motoric

fine motor skills

gross motor skills



Language

amount of words that toddler **understands**

amount of words that toddler **can speak**

starts using (mainly) nouns

- important people
- food
- animals
- everyday actions
- consequences of familiar actions
- objects that move

starts using verbs

- common actions

starts using more difficult grammatical words

- pronouns
- object properties
- prepositions

speaking one-word sentences

"Dada", "Car", "Drink", "Bey-bey", "hot"

start word explosion

speaking two-word sentences

"I do", "Papa drink?!", "car gone", "Why?"

speaking three-word sentences

"Dada", "Car", "Drink",

50 100 22 300 200 600 500 1250 1000

birth - 9 months | 10 - 17 months | 18- 23 months | 24-29 months | 30-36 months

2.3 The educational value of watching TV: opportunities & threats

There is much speculation about whether watching tv is beneficial to the child's development or not. The overall conclusion is that the way how tv is watched in today's context is less educational, then letting the child play due to certain factors. However, if these "threats" are identified, we can interpret them as design challenges. If these challenges are solved within the design of the response moments, then the educational value of watching television can be increased. By combining the "Learning through play" framework and the insights required from the literature study from the previous section, an overview is created that shows how certain factors threaten the educational value of watching television on different levels (see Figure 10). At the same time, opportunities are shown in this overview, which can be used as solution spaces within the design.

Furthermore, it is essential to know which learning goals can be supported by the series. An overview of the series' possible learning goals is shown in Figure 9. The series main learning goals will be chosen by 1) how toddler's watch television in the Dutch family context and 2) which leaning goals parent's find most important and trustworthy to be learned by television, which will be concluded from the context mapping research.

Figure 9
Overview possible learning goals for the series

Cognitive

Learning representational skills:

- Link pictorial representations from objects to words. However, the filmmaker should take the video deficit in mind when desiging the response moment.
- Speech
- Counting
- Colors
- Shapes

Social-emotional

Learn skills to get along with peers

- Sharing
- Recognize basic emotions and express feelings without hurting others
- Start learning to think from somebody else's point of view

Learning the social rules and skills that enable the child to live easily with other members of the community

- Basic and respectful social interactions ("Hi, "Bey", "yes, please")
- How you should behave in daily routines and events. Ex. going to the supermarket, brushing your teeth
- Familiarize with new (scary) events. Ex going to the dentist

Physical

Gain autonomy over the body (see Figure 8)

- Gross motor skills, such as crawling and walking which help children to move around their environment.
- Fine motor skills, which refer to single limb movements (like waving and reaching), and precice momvents of the hands of fingers (like pointing)

Get fit, improve muscle strength

Figure 10
Overview opportunities and threats which influence the educational value of watching TV

Opportunities:

- Lots of repetition can improve understanding. (Valkenburg & Piotrowski, 2017)
- Using the interactivity of tablets and phones to link from one video to another when a choice is represented.

Threats:

- TV is not reactive, so children can't have control over the outcome of the storyline.

Opportunities:

- Using situations close to the child's environment (ex. going on adventure in your own garden instead of in the jungle, or use objects that are introduced in child books already). (Valkenburg & Piotrowski, 2017)
- (Social-emotional) lessons are learned in parallel by unfolding of the storyline. (Hirsh-Pasek et al., 2015)

Threats:

- Video deficit: children can't link 2D pictorial objects to concrete objects in the 3D world. However, this effect can be mitigated by co-viewing or focus on abstract learning goals, like counting, colors and shapes. (Valkenburg & Piotrowski, 2017)
- Children can't connect some transitions between succesive shots. Like character walks out of screen on the right and appears on screen on the left. (Courage & Howe, 2010)

Opportunities:

- Dialogue between characters and storyline are becoming interesting from the age of 18 months. (Valkenburg & Vroone, 2004)
- Include songs and dancing
- Visual surprises within series. (Valkenburg & Vroone, 2004)
- Pleasing visual features. (Valkenburg & Vroone, 2004)
- Fantasy and animals als main characters (Valkenburg & Piotrowski, 2017)

Threats:

- When fantasy characters differ too much of reality, children can't make sense of them and become scared. (Valkenburg & Piotrowski, 2017)

Opportunities:

- Letting the child unconsciously know that content is for them. (ex, talk in higher voices, child songs, animated characters) (Hirsh-Pasek et al., 2015; Valkenburg & Vroone, 2004)
- Dancing and singing
- Create a "brains on mindset" by making children feel part of the problem (Hirsh-Pasek et al., 2015)

Threats:

- TV is "voorgekauwd", the child doesn't need to actively participate or imagine what is happening
- Too many transitions in a short time span, which leads to distraction learning goal (ex. events, cuts, zooms etc.) (Hirsh-Pasek et al., 2015)
- Too many irrelevant focus on objects, characters and events, which leads to distraction from learning goal

Opportunities:

- Co-viewing with parents. They could questions about the programs content, which triggers meaningful thinking within the child, which in their turn increases educational value. Or could overcome the video deficit by letting the child link the object shown on tv to an object in real life. (Hirsh-Pasek et al., 2015)
- Feedback from familiar tv characters which children have an emotional bond with, like Dora. The downside is that you really need to anticipate in what ways the child is going to react, and what kind of feedback is able to always react to the child's various reactions correctly. (Hirsh-Pasek et al., 2015)

2.4 Results context mapping sessions

A context mapping session was held to gain more insights about how Dutch parents influence the screen media use of their 1,5-3-year-old. A cultural probe booklet (see A.2-3) with six daily assignments was sent to prepare the parents for the issues covered within the interview. Eventually, five families participated in this research, all having at least one child between 18 and 37 months. The participants were mainly the mothers, with one family as the exception, where both parents participated in the interview. This means that the outcome of this interview mostly represents the opinions of the mother.

2.4.1 How parents are involved in the use of screen media of their 1.5-3-year-old?

What type of screen media do 1.5-3-years-olds generally use in Dutch families?

Children mainly watch series on smart-tv's. This way, the parent has control what the child is going to watch since the child can't control a TV controller. YouTube and Netflix are the main channels used for watching series, and can both be shown on television. Not only does television offer more parental control, but it also prevents that the child will come too close to the screen (see Figure 11.1-2). When children use a tablet or phone, parents often need to distance the child from the screen deliberately. Parents worry that when the child's eyes are too close near the screen, the screen light evokes damage to the eyes.

When children are put behind a tablet or telephone, they know very well how to start up an app and select their desired series by tapping on the thumbnail. In case when watching YouTube, children tend rather roam on YouTube then finish watching the episode. They will tap on thumbnails of recommended videos that appear while watching the video. These thumbnails show images they find particularly interesting (see Figure 11.3). For example, one mother told that her 3-year-old son always picks videos where the thumbnails show a car since he is very interested in cars. His interest in cars was also reflected in his play and toys. By adapting the thumbnails to the child's interest, children discover series on YouTube, and if they find these series interesting enough, they will ask to watch them.

Most parents were surprisingly okay with the fact that their child might see age-inappropriate content on YouTube since children can't type anything in which will lead to these videos. Also, commercials are in their eyes not that harmful, since their child probably won't understand anything of it at that age. One mother said that her son became scared of a spider shown on screen when he became around three years old.

Figure 11

1. Representation of how parent and child select an episode on tv
2. Representation on how toddlers behave when watching a series on a phone
3. Representation on how toddlers behave when watching a series on a phone
4. A 2-year-old who calls "Hoera" on encouragement of the parent
5. A 2-year-old imitating the dance moves from a ballet video
6. A 2-year-old who calls out "Oh no" for something bad that is happening on screen. These are the situations when parents are worried about if a series is too scary for their child

What kind of effects do parents see within their 1,5-3-year-olds when watching television, and to what extent are they content with those effects?

One of the main negative effects parents see when children are watching television is that they come in some mode where the children apathetically stare at the tv screen. At that point, parents can't seem to reach them, which make them worry. Although they don't know why it is precisely bad for the child, they don't like this particular state that the child is in.

On the other hand, parents see what kind of positive effects television can have on the child's development. Children sometimes repeat words that they have seen on screen or mention the emotions shown by the characters, also when the television is turned off. Therefore, parents think that their children do learn something from television.

What is most enjoyable for parents to see is when their child is actively engaged with the content (see Figure 11.4-5). This mainly happens when the tv shows introduce a song where children can dance and sing along. Songs are especially favoured by children when a dance is combined. From the age of 18 months old, children try to. From the age of 2, they are trying to imitate the dance moves on tv and sing along. From the age of 2.5, most children are able to copy the dance moves quite well and can sing along the text correctly. Parents find this kind of activity beneficial for the development of the child since dancing stimulates motor skills and singing stimulates language skills.

In which situations do parents put their 1.5- to 3-year-old behind a screen and why do they prefer screen media above play on those particular moments?

There are various situations where a parent might put their child behind the television. Parents also adjust their series depending on what kind of impulses can handle or need at that particular moment. Figure 12 presents four different scenarios in which parents put their child behind the television.

Distracting the child when doing something that requires full attention during the day

Parents who recognize this situation daily

Desired brain state when watching tv show:

Minds-ON

One of the most common situations is during the day when the parent is home alone with their child and can't give their full attention to their child since they need to do something for work or care for a younger sibling. Since toddlers demand a lot of attention and throw a tantrum when they don't get their way, parents feel obliged to put them in these kinds of situations behind the television to keep them busy. However, since it is during the day and the child is still full of energy, and their brains are basically "minds-on" due to their play activity. Parents don't want to waste this "minds-on" activity due to television. Therefore they will choose content that will try to learn their child new words or let them be physically active, like dancing.

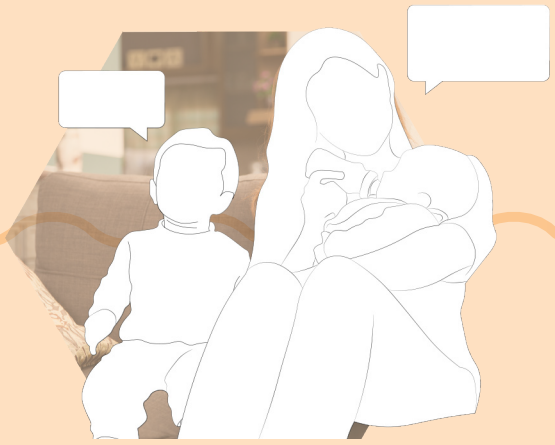
Interseting themes to explore:

Involve (already accessible) toys when watching tv

Dance&singing

Make music

Let the child feel that he is important for solving the problem



Distracting the child when feeding a younger sibling on the couch

Parents who recognize this situation daily

Desired brain state when watching tv show:

Minds-ON/OFF

When the mother needs to feed a younger sibling, her hands are full, and she can't keep her toddler entertained. In these situations, they will put their toddler behind the tv to keep him occupied. However, the mother might sit next to him on the couch, so it is more like a family moment. Although the mother can't hand the toddlers any toys, she can talk with him about the content on tv, which makes the experience more educational.

Interseting themes to explore:

Building a family bond

Taking care of others, in this case sibling

Be an example for sibling

Conversation about topics shown

Dance&sing or music performance

Figure 12
Four different scenarios in which parents put their child behind the TV and which effects they want the series to have on their child

Provide the child comfort and relaxation to pull them through the end of the day before dinner starts

Parents who recognize this situation daily

Desired brain state when watching tv show:

Minds-ON/OFF

When the parent needs to cook, and their child has been active on daycare or physically all day, they tend to let them a relaxation moment behind the tv. In contrast to the previous situation, they will choose content which has more narrative and hope their child will pick up at least some social-emotional lessons.

Interseting themes to explore:

Teaching social-emotional lessons

Music as a mild energizer

Calm the child before going to bed

Parents who recognize this situation daily

Desired brain state when watching tv show:

Minds-OFF

Some parents use the tv as a calming medium before their children go to bed. These are the parents that don't necessarily believe that watching tv before bed is bad for the sleep quality of the child. They will put on slow and low stimulating content to put their child into a more restful state.

Interseting themes to explore:

Imagination (a hybrid between dynamic and still images)

Building child-parent relationship

Reflecting on the day

Sleeping lullaby

In what kind of way(s) are the parents involved when their child is watching a television series?

Although the child can choose what he wants to watch, eventually the parent is in control when the series is watched on television. When watching a new series, parents will sit along and judge if the content is age-appropriate. They mainly judge the series on its negative aspects then it's positive aspects. Main dealbreakers are the following and should be at all costs avoided:

- TV shows that overstimulate the child. This is spotted by the parents when they see too many things happening on the screen, like fast-moving objects, weird camera cuts, a lot of flashing lights. In other words, a lot of impulses in a short amount of time.
- TV shows that address themes that are too heavy or scary for the child (see Figure 11.6).
- TV shows with no educational value, like the Teletubbies. In some of the parents' eyes, Teletubbies are unrecognizable creatures in random colours, talking gibberish. Finally, the content has no clear learning goal.

After a series has been approved, parents often let their child watch alone so they can focus on their own thing.

2.4.2 Key insights children's interests

What do children find particularly interesting when they are 1.5 to 3 years old, and how does it affect their watching behaviour?

Children go to different phases when watching television. When the child starts watching television between the ages of 2 and 3, the child wants to view a specific tv show only for several weeks. Children have for example a "Woezel&Pip"-, "Kikker&Vriendjes" or a "Peppa Pig"-phase. There is no chronological order in how children are watching these series, so development is not involved. Children probably want something new after a while. This means that it is risky to let the Pixifox' series "grow" with the development of the child since the child might want to watch something new anyway.

Children are most actively engaged when tv programs contain a song AND a dance. Children get even more enthusiastic if the song includes a dance so they can mimic movements. Parents like to see these kinds of reactions when their child is watching television. Children are most reactive to child's music. They don't like listening or dancing to adult music.

Children seem to have an affection towards animals from an early age. Parent don't seem to know why, but animals are always a hit with the children. Children can also identify a lot of animals when they are around the age of 2 since a lot of animals are already depicted in child books.

2.4.3 In what ways do parent try to stimulate the development of their 1.5-3-year-old?

What kind of development are parents trying to stimulate when their child is between the 1,5-and-3-years old, and to what extent do they thrust that tv can contribute to these developments?

All kinds of development are equally important to parents. However, parents do have more learning goals related to the social-emotional level. All the learning goals are shown in Figure 9. Although parents think that tv can be one of the most significant contributors to teach their children about these learning goals, they are more critical towards the content shown within the series when it serves a social-emotional learning goal. This is due that the parent doesn't precisely know if their child learns these lessons in the right way. Series that promote motoric and cognitive skills, like dance and learning words, are more trustworthy since the parents can check the facts themselves.

To what extent do parents think that educational screen media can contribute to the child's development in comparison to play?

TV series fall short the most because they don't make the child actively think. Content is being presented on a silver platter. The plot will always turn out to be okay, without the child needs to do anything. But also in the sense that the child doesn't need to actively think about how images might behave, according to what the narrator is telling them. This does happen when the parent is reading a book with illustrations.
Play in comparison allows the child to try out several actions of his behaviour. The child can iterate on his ideas, and adjust hypotheses and strategies to reach his goal. Integrating the "actively engaged" and "iterating" element within tv series could, therefore, be from immense value for children and parents (see Figure 13).

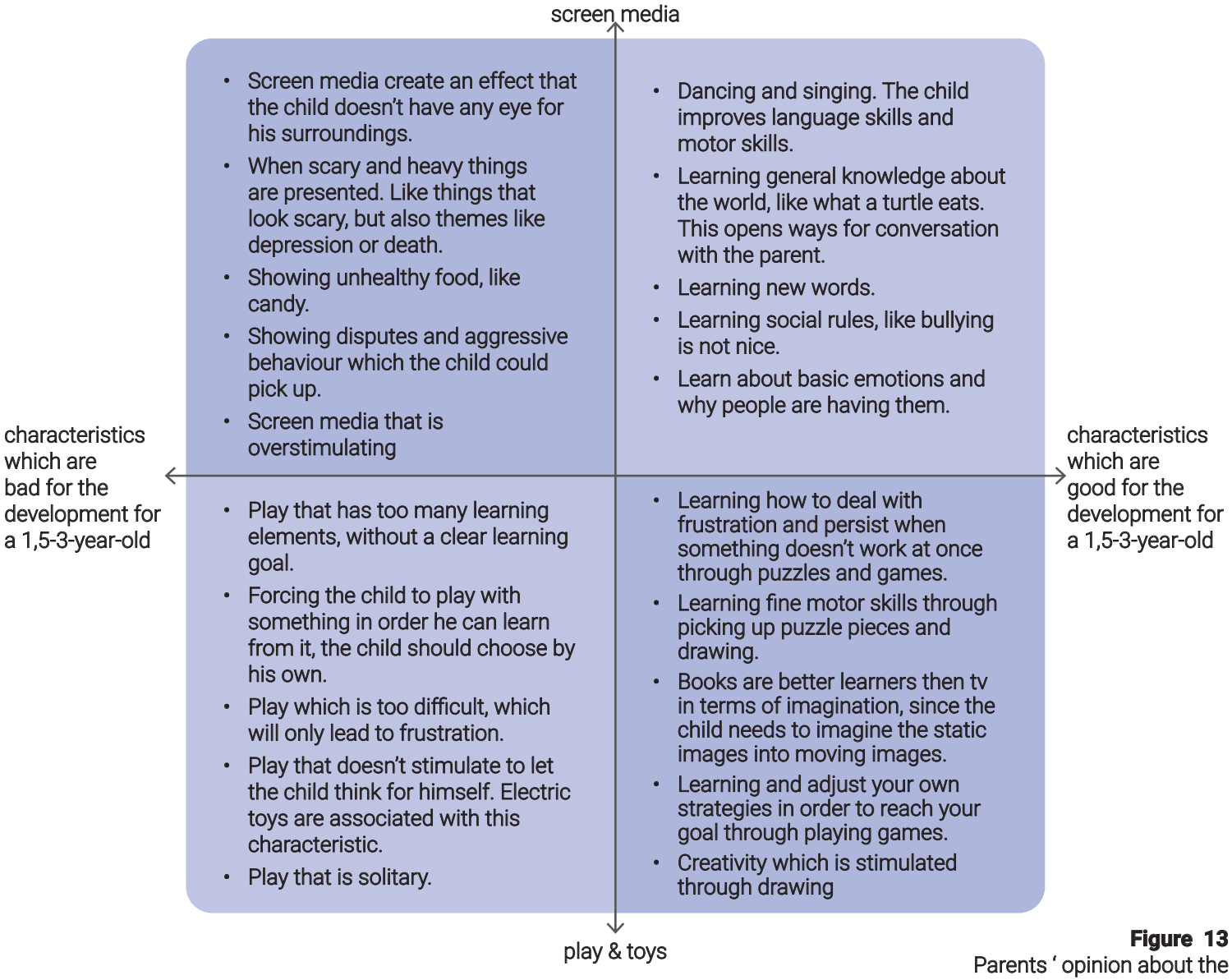


Figure 13
Parents ' opinion about the good and the bad qualities of toys an screen media

Main insights

- Toddlers watch series more often on a television then a phone or tablet. Therefore the design of the response moment will be adjusted to the interactivity that the TV has to offer, which is less then tablets or phones. The series should anticipate how the toddler is going to respond and should give the toddler feedback accordingly.
- Parent's biggest concern about their child watching tv is that their child is not actively engaged with content. They feel this concern especially when they put their child behind TV during the day, since that is the time when the child should explore and learn about the world. Tackling this problem in the series would help a large group of parents.
- Parents do believe that TV can be from positive influence on the child's development. Learning new words, learning about daily situations and basic emotions, dancing and singing are considered educational. So these learning goals are most safe to choose for the series.
- Parents often let their child watch TV alone. Parents are only involved when picking a serie to watch or to check if a serie is appropriate for the child's age when watching the serie for the first time. So the series should make a good impression on parents on those moments. Also the series should be able to trigger a response from the child, without the help of a parent

2.5 Triggering response moments among toddlers while watching TV

Parents often experience that children become in an apathetic state when watching television. Watching television is kind of 'lazy", since everything is presented on a silver platter, and children don't need to actively think about the content that is shown to them. Therefore we need to know how we can design a series' which can trigger the child into active engagement, without encourgement of parents. However, before the series can let a child actively engage with the content, it first needs to attract the child's attention to the right place on screen. Finding out what features can steer the child's attention to the target object on screen is important for the series, since toddlers are easily distracted.

2.5.1 Feaures which attract the toddler's attention

Since toddlers don't know always where to look at the screen when something is presented, they need some cues to attract their attention to the target object. The following cues help to attract the toddler's attention to a certain target on screen (see Figure 14).

- The eye gaze of all characters point to the same thing: joint attention is one of the earliest way people use to attract a toddlers attention to a certain object. Children can are trying to determine to where the character is looking at by following their eye gaze.
- A character points to the target: Just as joint attention, pointing towards the target object is one of the earliest ways to attract the child's attention.
- Verbal cues like "Look at that" or "Doesn't this look exciting": Children recognize these senteces as cues that something interesting is coming up, which spikes the child's attention attention towards what that person is trying to show.
- The target object moves: They eye naturally attracts to object that moves. It is therefore important if you want the toddler's attention, that only the target object is moving and other elements on screen are still.
- The target object has bright colors: Children are naturally drawin to bright colors. Using a contrasting bright color compared to the rest of the screen, can make an object stand out from the rest.

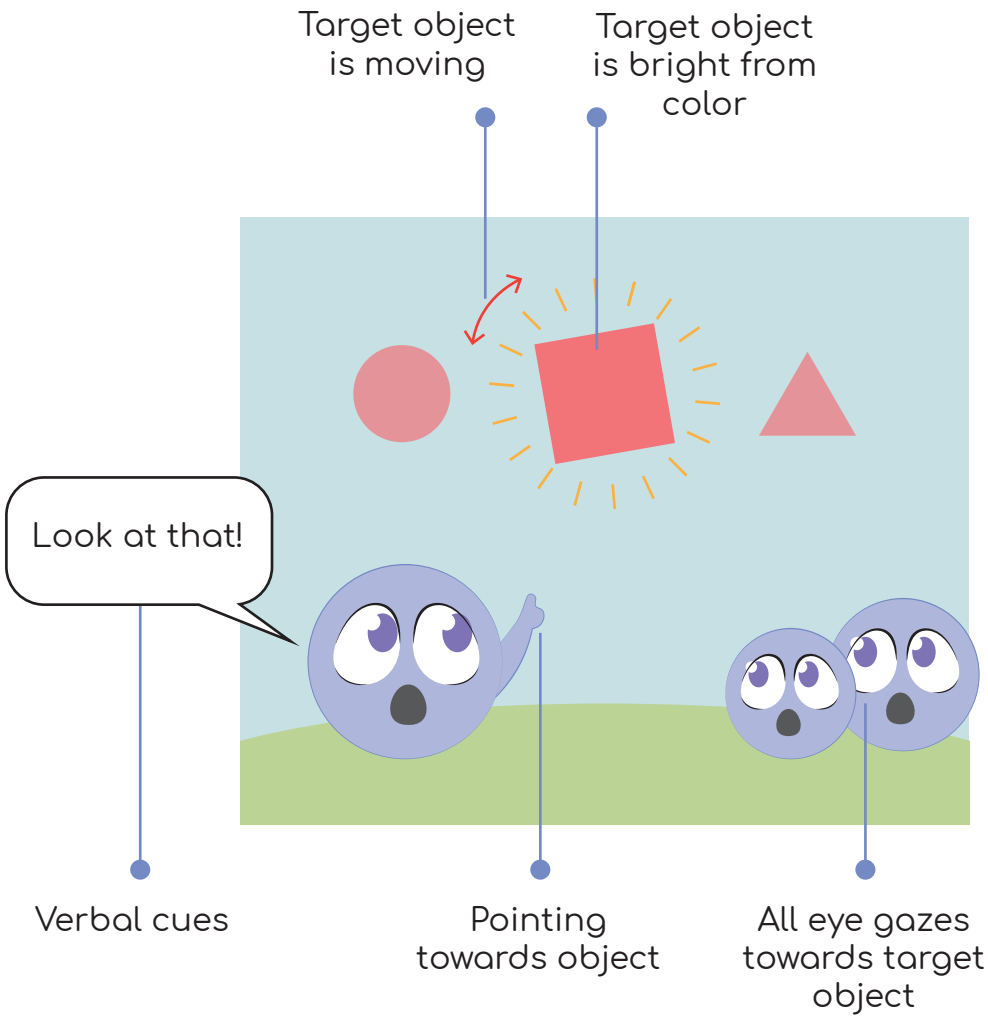


Figure 14
Example of how features can be used in a shot to attract a toddler's attention towards a target object

2.5.2 Features which trigger a response among toddlers

Once the series' got the child's attention, it is possible to trigger children to response what is happening within the series through participatory cues (see Figure 15). Participatory cues provide children with time to reflect on the educational content and to engage with the lessons, a type of interaction that is particularly important for younger children, whose information processing capacity is relatively limited (Daniel R Anderson et al., 2000; Calvert et al., 2007).

Using distinct auditory cues

Distinct auditory cues communicate to the child what behaviour is expected from them(Fisch, 2004). These sounds can be structurally used within the series (ex. when characters encounter a problem, when multiple answers are presented on the screen, or when the correct answer is shown). By structurally implementing auditory cues, the child can extract messages from them. Like that soon a response is required from them so they need to pay attention or that they are allowed to respond.

Make clear how the child should respond

Open-ended questions are often too difficult since the retrieving memory abilities of toddlers are still limited. When answering an open-ended question, toddlers have a lack of clues to access their memory, which lead them having no clue where to begin to answer the question. By introducing multiple options on the screen, the child can still make some educated guess in case they don't know the answer (Fisch, 2004; Fisch & McCann, 1993). Or questions which can be answered a simple yes or no. Eitherway it should be clear to the child how they can respond. When options structurally reappear over the episodes in the same visual way, children know that a response is required from them.

Ask a clear and well-defined question

The problems that characters and viewers need to solve are clear and well-defined (Fisch, 2004; Fisch & McCann, 1993). It is essential to know what kind of questions children already understand at that age, and formulate the questions in words that they already know.

Breaking the 4th wall using direct gaze

Children will focus on the thing where the character is looking at, by following the character's eye gaze. When the character shifts their eye gaze directly towards the child, the child will feel that they also take part in the conversation.

Provide response time

Sufficient time is needed to allow viewers to respond before characters supply the correct answer (Fisch, 2004; Fisch & McCann, 1993). By keeping the visual and auditory activity within the series low, the child knows that is their turn to give a response. In Blues Clues and Dora the Explorer this time is usually between the 5-6 seconds. Since these series are in general meant to be for children between 3 and 5 years old, younger children might need some extra time in order to respond, so 7-8 seconds.

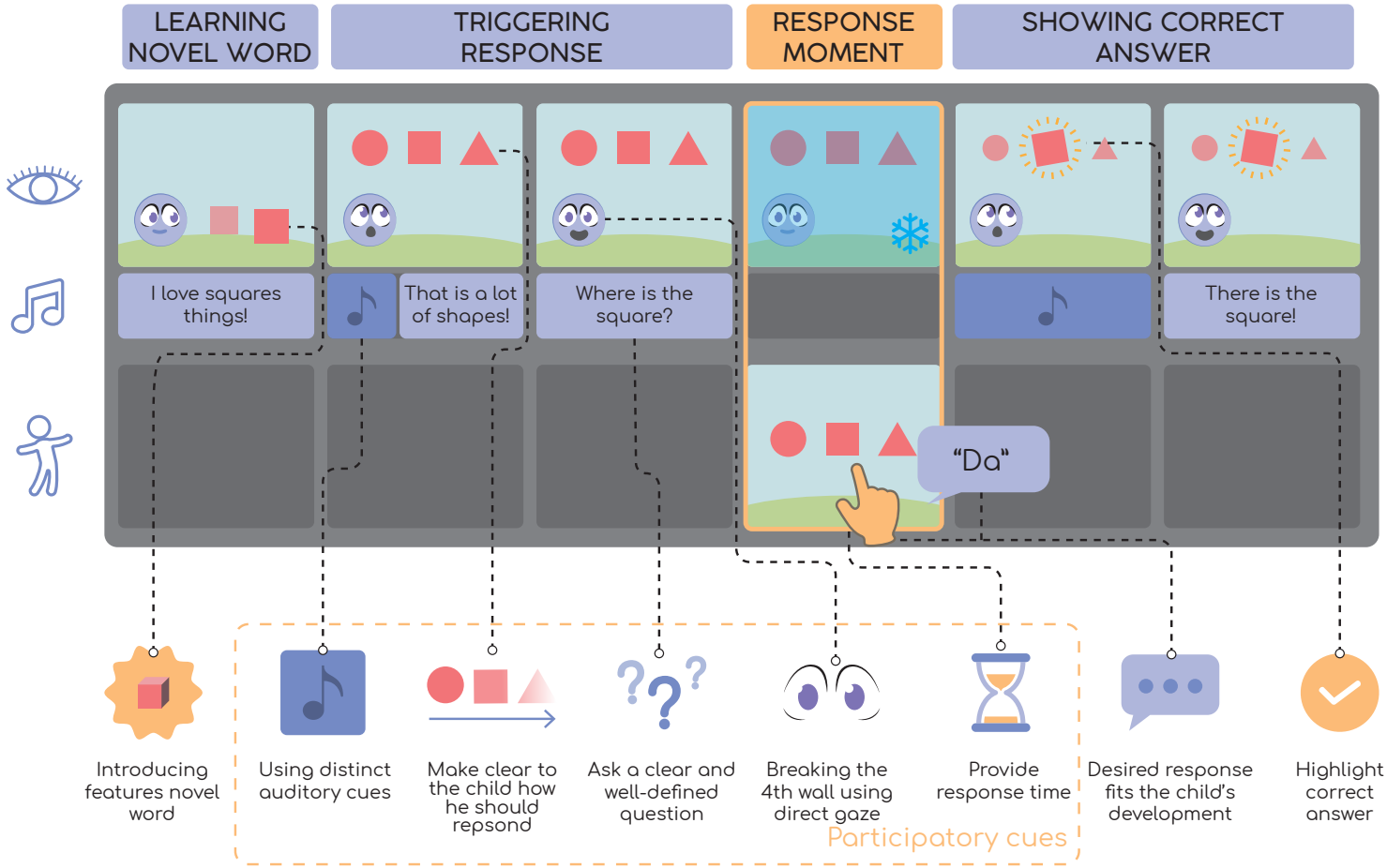


Figure 15

Representation of how participatory cues can be used within a storyboard to trigger response moments among toddlers

Main insights

- The series should actively steer the attention of the child towards certain objects on screen to lead them through the story and let them actively engage with the series' content. This can be done by using the eye gaze of characters, character pointing towards the target object, verbal cues, let the target move and using bright colors.
- Once the series got the child's attention, it should use participatory cues in order to trigger the child to actively engage with the content. Response moments should use disitinct auditory cues, making clear to the viewer how he should repsond, ask a clear and well-defined question, using direct eye gaze an
- It would be preferable if the series' central theme would be introduced within the episode before the child needs to actively answer a question about this theme. This way they can make some kind of educated guess when the response moment arives. However, it is not that bad if this introduction doesn't happen, since toddler like to watch episodes over and over again and therefore can give an educated answer the next time they watch the episode.
- After the response moment, the series should give proper feedback to the child.

2.6 Teaching toddlers about new concepts in a way that they can understand

Parents like to see that their child actively learns about new words and how to behave in daily situations when he is watching television during the day. But how should these novel concepts be presented to the child in a way that it fits their cognitive development? After all, in order to let television contribute to the child's development, the presented content should fit the current knowledge of the toddler.

In this section, we discuss what strategies toddlers use to acquire the meaning of novel words and why it is important to know these strategies. By having a deep understanding of how these strategies work, we can use these strategies in the episode builder's design.

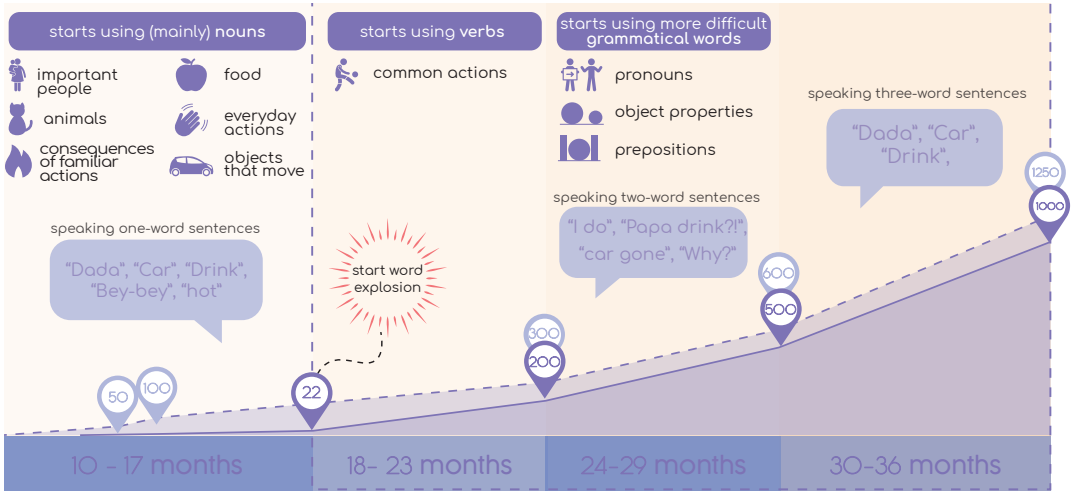


Figure 16
Timeline how language develops when children are between 10 and 36 months old

2.6.1 How language and the acquisition of meaning are connected

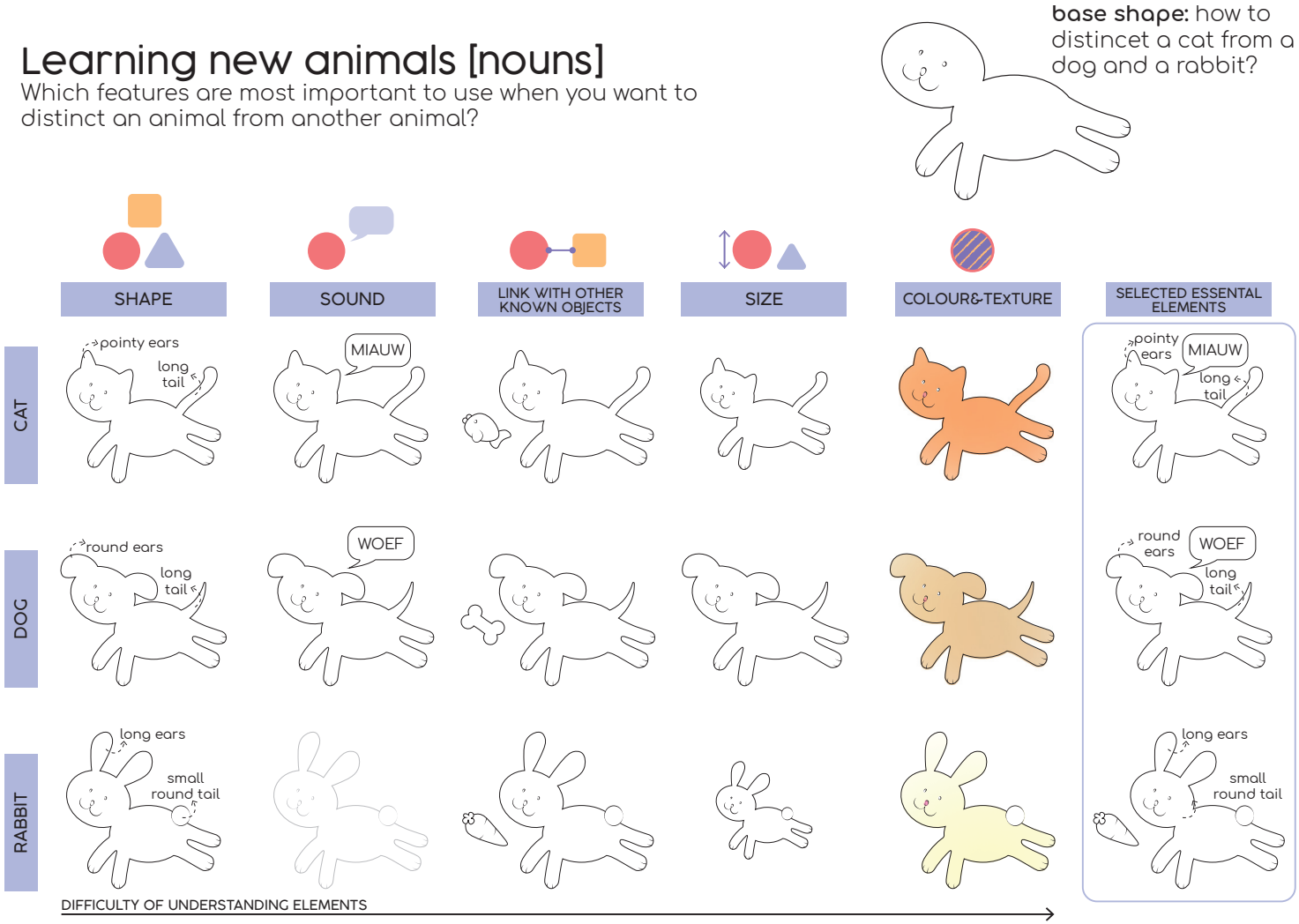
Researchers state that language development is positively related to how much children can understand what is happening around them. It is therefore essential to use vocabulary that children already understand within the series in order to acquire meaning from the story. When children are 18 months old, they already understand more than 100 words. These words are mainly things they can point to (nouns), which are close to their environment (see Figure 16). Words that involve important people, animals, food, objects that move are therefore safe options to use and can form the base of the episode. From here, the series can introduce novel words and show the toddler what they mean. This way, the toddler can slowly expand their knowledge about the world.

The study of semantics refers to the developing knowledge of word meaning and how we acquire the meaning of words. For adults, learning a new word is a simple process. They simply look up what the meaning of the word is in the dictionary, and then they understand what the explanation is trying to say. However, explaining a novel word to a toddler is not that simple. For example, if a parent points to a dog and says "What is that? That is a dog!". How does the child know which aspect of the situation the word "dog" refers to? Is it the fact that the pointed object has four legs, that it is furry, or that it is an animal?

When the wording explosion begins around 18 months old, children start to overextend the words they know. Overextension often occurs based on perceptual similarity: a child could call all object with four legs a dog, while the object they are pointing to is actually a cat. However, underextension can also occur, where children point to their own dog and call them "doggie", but cannot recognize that a dog from another race is a dog as well. Therefore, toddlers need to expand their knowledge about which features they must look out for to categorize a novel object. This way, they get a better understanding of the world and recognize what they are experiencing.

Meaningful

Figure 17
Overview of which features are most effective to distinct one animal from antother



2.6.2 How toddlers learn the meaning of words

Children use a combination of two strategies to acquire the meaning of words, namely 1) lexical language acquisition and the 2) learning-abstraction acquisition. Both will be explained in the following paragraphs.

Word learning strategy: lexical language acquisition

According to lexical accounts of language acquisition, children learn new words by learning specific knowledge that belongs to that particular word. For example, the noun "dog" can be distinct from the noun "cat", since the dog has a slightly different shape than a cat, such as having round ears instead of having pointy ears, and a saying 'woof' instead of saying 'miaow' (see Figure 17).

This similarly also applies to when learning verbs. Like learning the difference between the sentences (1) Mary kissed Bill and (2) Mary kicked Bill. The child can see visually see the difference in features between the two actions. Such as that when Mary kisses Bill, she uses her lips. And when she kicks Bill, she uses her legs.

So children can categorize novel words by acquiring "knowledge" to the object. However, certain types of "knowledge features" are more effective in being able to help the child to categorize an object than other features (see Figure 18). For example, studies have shown that toddlers use the shape as the main determinant to distinct objects from each other, this is also known as the shape bias. So if two objects are the same shape, they are likely to belong to the same category.

Furthermore, early world learning can also be stimulated by showing the function of a novel object to help infants to categorize objects. For example, what kind of sound the object makes, or what the object typically does. They can do this when they are 14 months old.

For 1.5-3-year-olds, adjectives are the least effective features to use to categorize objects, since they are starting to learn adjectives when they are 24 months old. This does not mean that object properties like size, colour and texture cannot be used as a highlighted feature to categorize ob-jects. However, filmmakers need to take in mind that features like the overall shape or adding functionality are more effective measures than adjectives.

Word learning strategy: the early-abstraction theory

According to early-abstraction accounts of language acquisition, children acquire facts about particular words, but are also constrained to represent knowledge of sentence structure in terms of a more abstract mental vocabulary (e.g., Chang, Dell, & Bock, 2006; Fisher &Gleitman, 2002; Pinker, 1989; Wexler, 1999). The abstract word-pattern theory supports the idea that children develop a skill where they use word order to determine what kind of word they are dealing with, like a noun or verb. This word order is dependent on what kind of linguistic typology the language uses. The most common linguistic typology used around the world, among which English and Dutch, is the Subject-Verb-Object structure (SVO) structure. Sentences that follow the SVO structure are like the following:

- ENG: Tim [subject] kicks [verb] the ball [object]
  NL: Tim [subject] schopt [verb] de bal [object]
- ENG: The monkey [subject] eats [verb] a banana [object]
  NL: De aap [subject] eet [verb] een banaan [object]

When following these sentence structures, a child gets a quicker understanding of the meaning of a certain verb. As the subject will always be the one who will execute the action. In the case of the sentence where Tim kick the ball, Tim is the kickee, also known as the 'agent'. And the ball is the one who is kicked, also known as the 'patient'. The meaning of the second word, in this case 'kicks', can be acquired by linking to following two features which are shown on screen: 1) the agent's motion and 2) the motion's effect on the patient (see Figure 18).

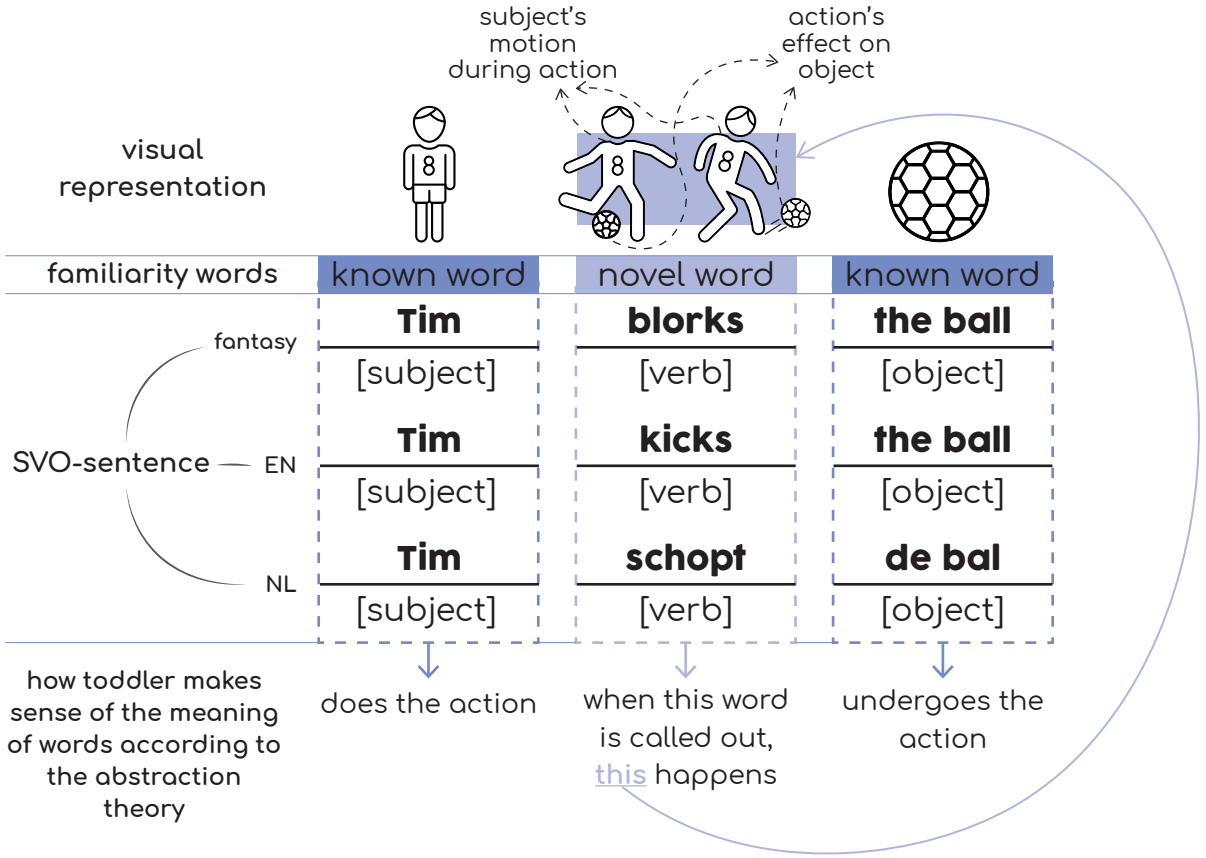


Figure 18
How SVO-sentence structures help toddlers learn the meaning of novel verbs

Furthermore, abstraction theory could also get the child's attention to a certain object that will appear on-screen by using the words "Look what is that?" and "It is a [name object]". Children recognize these sentences as a cue when a novel world is introduced and can get familiar with the phonetic speech of the novel word. This way, they know exactly where the word should be-gin, namely after the cue "It is...". And when the novel word ends, by listening to the short pau-se until the next sentence begins. By placing the novel word on a fixed place within the sentence's structure and create several similar sentences around this novel word, the child gets 1) a phonetic understanding how the word should be spoken and 2) acquire knowledge about the meaning of this word. Let's say we want to teach the child the word 'monkey'. The story should look like the following:s

Sentence storyboard	Goal sentence
"Hey, look what is that?"	cue that something new is coming and attract attention child
"It is a monkey!"	introducing the word monkey
"The monkey likes bananas"	1) acquiring knowledge about the word monkey and 2) training how to distinct the word monkey when hearing a sentence.
"The monkey eats a banana"	
" The monkey lives in the jungle"	

Table 1
How SVO-structure can be used to learn the meaning of novel nouns

Main insights

- If the series wants to teach toddlers about novel concepts like animals, people, daily situations etc.., the series need to make clear to toddlers to which features they must look out for to categorize a novel object. This way, the viewer get a better understanding of the world and recognize what they are experiencing.
- Since toddlers have a limited vocobulary and understanding about the world, the series should teach them about novel concept which are close to their environment. When introducing a novel concept within the series, it should be explained with the toddler's vocobulary as much as possible.
- When teaching novel nouns (like "what is a bee/ doctor/ car?") , filmmakers should focus their teaching on the noun's overall typical shape first, and then adding a typical function. Explaining a novel noun through adjectives like "small" or "red" are less effective, since children start to learn this concept when they are 24 months old.
- Verbs can be learned by showing the child the agent's motion when performing the action, and what kind of effect this motion has on the patient. Showing these features can help the child learn about daily situations, like brushing your teeth.
- The series must use active sentences that follow the SVO-structure as mush as possible. This way toddlers can better understand what novel words in a spoken sentence mean.

2.7 Design goal

The context mapping session revealed four different scenarios in which parents put their toddler behind the television. In each scenario, parents had a different reason why they would let their child watch television, and they expected a different effect on their child. Since these four scenarios are so different from each other, the series would fit the parents' needs better if it was designed for a specific scenario.

The scenario which was most recognized among parents and which they felt most troubled about, was the scenario in which they let their child watch television during the day. In this situation, the parent wants to distract their child by letting him watch tv so the parent can do something that requires their full attention, like caring for a younger sibling or doing some work. However, what troubles the parent is that the act of watching television is a passive activity, and their child doesn't need to actively think about the content they are watching. During this time of the day, parents rather see their child actively explore the world and practice their skills through play, since their child is full of energy. A passive activity like watching television seems, therefore like a waste of time.

In this situation, parents prefer a television series which helps their child actively learn about novel concepts, like novel words, daily situations, counting or shapes. Parents perceive a series that improves the child's motor skills also as a fitting educational activity at this moment, as long the movements are safe to perform without the full supervision of the parent.

However, the reason why children are in this position where they don't need to actively think about the tv's content is that they don't get to play an active role within the story. Most series 1.5-3-year-olds present a series of events around a central theme, without involving the child in any way. This allows the child to be more in a passive mindset, which results in that they don't need to reflect on the content as much, then if they were in a more actively engaging position.

Therefore the design goal of the series is stated as the following:

Figure 19
Selected situation for designing the response moment

Design goal:

Let 1,5-3-year-olds feel that their input is needed when watching the episode's response moment during the day.

Context specific requirements for the series

In section 2.3, an overview was given with opportunities and threats which influence the educational value of watching TV. However, by choosing a specific context for the series, it also narrows and specifies the ideation scope for the series. This results in some context-specific requirements, which are the following:

- The series main learning goal is teaching the child novel words, daily situations, counting or shapes. Improving motor skills which are safe to perform without the supervision of a parent is fine as well.
- Since there is no parent around to give the child hints where he or she needs to focus on the screen and when to react on the episode's content, the series should be good in the following things: 1) guiding the child's direction towards the educational content on the screen and 2) trigger a response from the child.
- This also means that the series need a character which the child has an emotional bond to trigger response moments throughout the episodes. Like Dora the Explorer but then for a slightly younger age group.
- Since parents are not around to keep an eye on the child, every response triggered within the response moment should be safe for the child to perform without supervision of the parent. It should be more clear which types of responses are safe to be executed by the child without supervision.
- The final disadvantage of not having a parent involved when the child is watching the series is that the video deficit might affect the effectivity of the learning process. Especially when the child is learning about novel objects and situations since the child has difficulties to connect the pictorial representation to the 3D world without a parent. It would benefit the series if a parent could help the child link the episode's content to the real world after the episode is finished.

2.8 Interaction vision

Although television is not an interactive medium, the way how toddlers interact with the characters can be changed within the series. Currently, most characters in the series for 1.5-3-year-olds don't involve their viewers within their stories. Metaphorically speaking, the child is sitting on the back seat of the car, and doesn't need to do anything to drive the car towards its destination and can sit back and enjoy the view. Meanwhile, the parents sitting in the front, who resemble the characters, discuss where to go and drive the car towards its final destination. In other words, the child doesn't get involved with the characters conversation, and the story will play out itself without needing the help of the child. This allows the child to keep playing a passive role when it comes to watching television.

For designing the response moment, I want to change the role of the viewer within the story. Which also changes the way how the viewer interacts with the character. Figure 20 describes an interaction vision about how the viewer should feel like when watching the response moment. The child would, metaphorically speaking, be put in the front seat in the car as co-driver while the character will be still behind the steering wheel, controlling the pace of the story. By sitting in the front seat of the metaphorical car, the viewer now feels that he is considered as a conversation partner and can influence the story.

Figure 20
Interaction vision about how it feels to the child when he 'communicates' with the character during the response moment

"Helping the driver to navigate as a co-driver when you are asked to during a road trip"

COLLABORATIVE	Both the driver and co-driver play their role to get successfully to the destination
ATTENTIVE	The co-driver listens carefully about what the driver needs to know and act on their questions.
EQUAL	Sitting both in the front and therefore having a shared view of seeing what comes next.
EXPRESSIVE	Giving the driver clear directions by speaking out loud or point towards the direction the car needs to go
CONTINUOUS	The driver will let the car drive until the destination has arrived, in which the co-driver cannot influence

2.9 Design guidelines for creating an educational episode

As conclusion of this section, all the main insights are translated into design guidelines for creating a series that contains an educational response moment (see Figure 21) . The guidelines are devided into general guidelines and guidelines that support the elements of "Learning through play".

The general guideilnes are more context specific focussed. In this case how Dutch parents let their toddler watch television during the day and what kind of effect they expect in this situation.

The five different types of "Learning through play" design guidelines describe how to maximize the series educational value on different levels.

General guidelines

The series should actively teach the child about link words to their representation, how to perform daily situations, counting, colors and/ or shapes. Furthermore, a series that improves the child's motor skills is approved by the parents as well

The response moments should be safe to be performed by the child, without the supervision of the parent

The response moment should work together with interactive abilities of a television

The central theme is preferably arleady introduced within the episdoe before the response moment begins

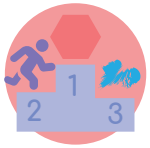
Meaningful

Transitions between succesive shots should be minimized

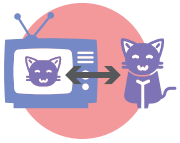
The series' setting in which the novel concept is teached should match the toddler's environment

The dialogue used within the series should match the toddler's vocabolary as mush as possible

The series should use active sentences, which follow the SVO structure as much as possible

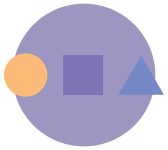


The series should use the toddler's word learning strategies to increase the effectivity of the learning proces when introducing novel words



It would be nice if parents are able to link the episode's content to the real world when watching tv is over, to minimize the video deficit

Joyful



The story lines of the episode should contain enough variety to keep the toddler interested

It would be nice if the response moment would involve making music, dancing and/or singing

Actively engaging

Every shot in the series should have one clear point of attention for the toddler to focus at

Response moments should be triggered through participatory cues

After each response moment, the correct answer should be highlighted so the viewer can reflect on their answer

The desired response fits child's verbal and motor abilities

The episode is between the 2.5 and 6 minutes long to fit the child's attention span

Socially interactive

Response moments should be triggered by a charactre which the child has an emotional bond with

Figure 21
Overview design guidelines for creating an educational episode

3 Design response moments

Introduction

This section focusses itself on translating the design guidelines from the previous section into response moment concepts. All the response moments should fit the context when the toddler is watching television during the day, while the parent needs to put their full attention on another task within the house.

Section 2.6 concluded that the response moments should fit the child motor and verbal abilities. Therefore, this section explores possible responses from the child first, which are also safe to perform without the parent's supervision. For each type of response that suffices to these two criteria, a response moment concept is designed with its own strengths of teaching the child about novel concepts. Filmmakers can alter between these response moments between episodes to add variety. But also to select a response moment which teaches about the episode's central theme in the best way possible.

3.1 Overall structure episode

Without the help of a parent, the series should be able to trigger a response from the toddler in its own. This means that the series should have a well-designed character which the child can build an emotional bond with throughout the episodes. Research already showed if a child has a great emotional bond with the character, they are more likely to respond to their requests (Hirsh-Pasek et al., 2015). The character will play a fixed role in the series as an enabler for triggering responses and provides a certain structure to the series.

Pixifox Animation has in-house character designers who are expert in their field. Due to the pledge of secrecy, these characters won't be shared within this report. However, filmmakers who are testing the episode tool need to have some understanding that a fixed main character is essential for triggering responses. Also, it gives them a starting point to build a story around a specific theme, and they can experiment with explaining central themes in different ways within a specific story world. Therefore a set of mock-up characters are designed for testing the episode builder when filmmakers need to create educational storyboards around a specific theme.

Meet Kiki: the episode builder's mock-up character

Kiki is the episode builder's mock-up character who will be the centre of the story and will lead the response moments. Research showed that young children rather attend to show which are clearly made for them and like to watch other children (Hirsh-Pasek et al., 2015; Valkenburg & Vroone, 2004). Therefore Kiki is a young child as well, who is also in the state within her life in which she explores the world as well. She will come across something new in every episode, which is the episode's main central theme. She will learn about what this novel object or situation is, which results that the series' learning goal is embedded parallel to the series' storyline. Between halfway and three-quarter of the episode, Kiki will trigger a response moment in which she will ask the viewer to help her out. This way, the viewer becomes into a more equal position to the character, since they are both equally important to let the story end well. Kiki makes a connection with the viewer by using the direct gaze when she wants to "communicate" with the viewer, as mentioned in the participatory cues.

The importance of the series' setting

The design of the series' setting is also quite important to assure that the child understands the story that is presented to them. Since a toddler does not have much experience within the world, many places and people are still unfamiliar. In order to make sense of the episode's central theme, the central theme should be presented in a way that represents the toddler's environment. So instead on going on an adventure in the jungle, it is better to choose a setting which is closer to home, like going on an adventure in your own garden

Therefore, the world of Kiki represents a lot of the toddler's world (see Figure 22) . The stories will be set in Kiki's own house. Or the setting will be moved to something which the toddler already know from regular family trips, like the playground, at the house from somebody close, the forest, farm, the beach, the zoo.

Also, the other characters around Kiki should represent the people who are close to a toddler in real-life. Like mom and dad, siblings, grandma and grandpa, friends and other people in the city.

Building a story world which is close to the toddler's environment will be a solid base to explain new concepts and improve the story's comprehensibility. Moreover, it should be embedded in the episode builder's tools as well.

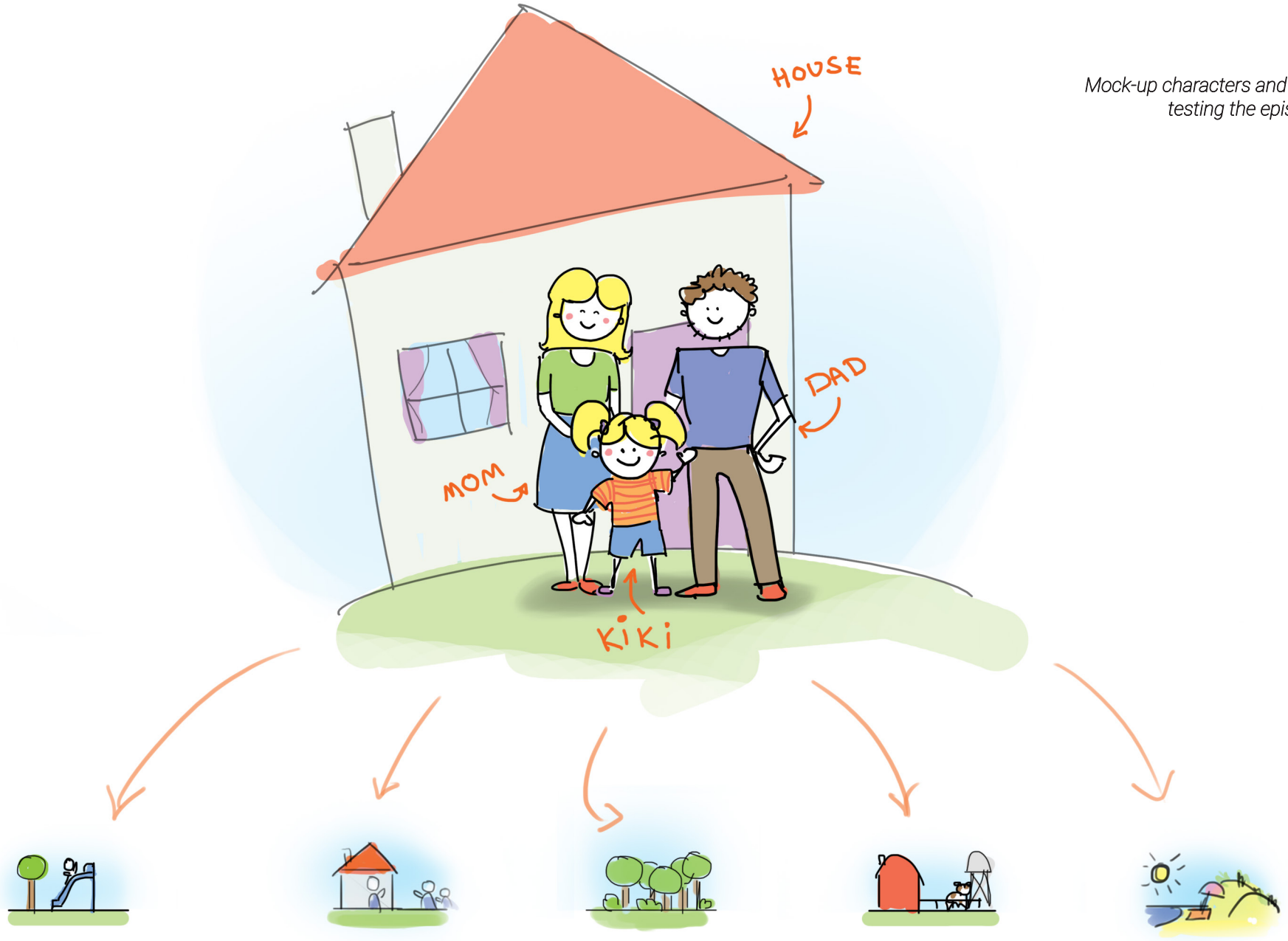


Figure 22
Mock-up characters and settings for testing the episode builder

3.2 Selection appropriate response types for response moment

Pixifox wants to have a wide variety of response moments to integrate into their series. To ideate different response moments that fit the child's abilities and their parent's needs, we need to distinguish different response types which are appropriate and which are not (see Figure 23)

The selection of appropriate response types is dependent on several criteria:

1. *Whether the child is developmentally able to respond in the way they are supposed to;*
2. *Whether the response type is responsible when a child is executing the response type while watching television without the supervision of a parent.*

The parent's desirability of the response type is something to be determined in interviews later.

Approved response types

- **Pointing:** Toddlers use pointing to communicate with others starting from the age of 10 months old. When they are 18 months old they already can answer questions like "Where is the cat" through pointing. Pointing fits the development of the child and is safe to perform without the supervision of a parent. Pointing to things on screen could be a great opportunity to learn nouns, shapes and colors
- **One-word responses:** When children are 18 months old, their word explosion begins. From this moment, they will learn 10 words per week. In the beginning, they are only able to produce one-word sentences. For the response moment, two sub-types of one-words responses can be distinct:
    - *Word labelling:* Since children only can speak a one-word sentence, they are mainly labelling things about what they see or want. Their first spoken words are mostly nouns which are close to their environment, like animals, people close to them, food and objects that move. These words are probably easier to use in response moments. Once they are 18 months old, they slowly start using verbs. However, their meaning is more complicated to understand than nouns. Labelling objects with colours and shapes are very relevant to practice with this age group, but toddlers will start applying these words correctly once they three years old. So, in that case, the response moment shouldn't be dependent on their answer.
    - *Yes and no:* Toddlers already understand the difference between yes or no. With these types of responses, you teach toddlers how to behave in daily lives by asking them if something goes the way how it supposed the go. But you can also learn toddlers to match visual representations of nouns, verbs, shapes and colors to their corresponding words. However, when toddlers are 18-months old, they start their "toddler-puberty" and enjoy saying "no" just for the sake of it. Therefore their actual responses while watching these response moments should be tested.

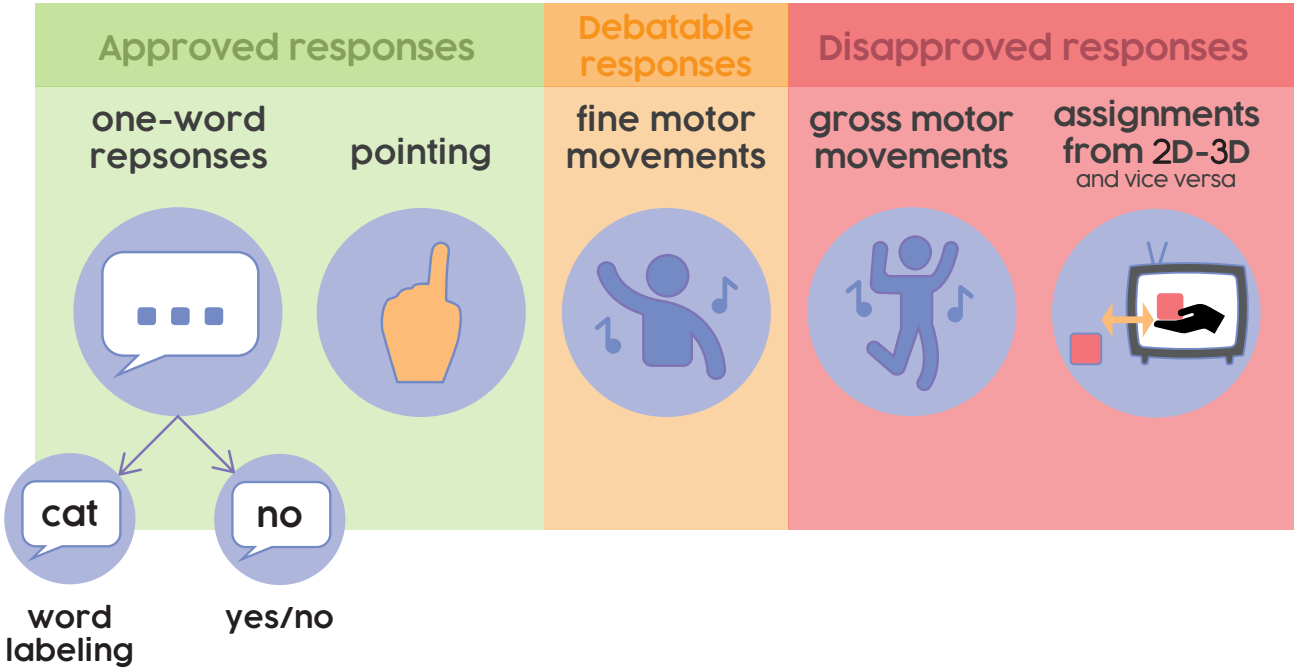


Figure 23
Overview of different types of resposes and their suitedness for designing a response moment

Disapproved response types

- **Assignments from 2D-3D (and vice versa):** Children are suffering from the video deficit until 2.5 years old. This means that toddlers aren't able to do assignments with real-life objects when following instructions which are given on-screen. This is because they don't understand yet that the 2D instruction is just a representation of the 3D object.
- **Gross motor movements:** Toddlers are eager to explore gross motor movements, but they are still a bit clumsy when performing them. It's not unlikely that they will fall from time to time, and without a parent to keep an eye on them, it is irresponsible to let toddlers perform these movements in this context.

Disputable response types:

- **Fine motor movements:** Imitating actions from characters, could be a way for toddlers to actively learn to label actions to their corresponding verb. Children will practice their fine motor skills by doing these actions. Fine motor movements disturb the toddler's balance less when the toddler is exploring them in comparison to gross motor movements. It is probably safe for toddlers to perform fine motor movement like clapping, waving, putting an arm high without the supervision of a parent. However, it is best to check with parents if they feel okay with that.

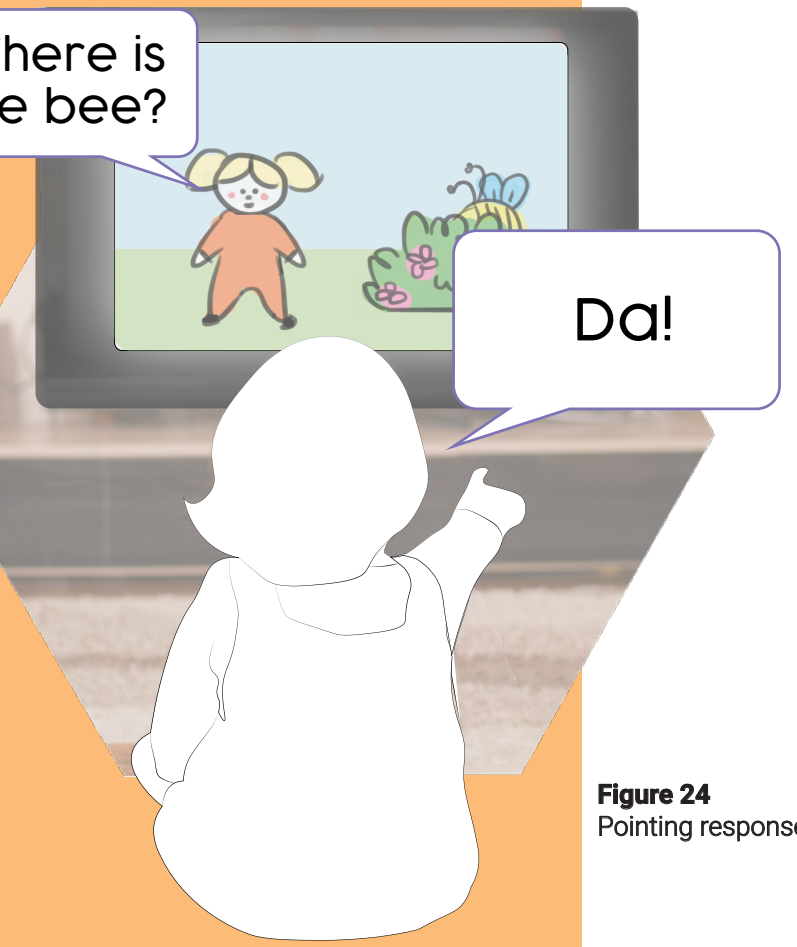


Figure 24
Pointing response

Figure 25 (right page)
Storyboard Hide-and-Seek and what kind of effect each shot has on the child

3.3.1 Pointing responses: Hide-and-Seek

Response type: pointing response

Suitable categories: animals, people, things

Learning goals: The child is stimulated to actively link the object's distinctive auditory- and visual features to its corresponding word.

The child learns to link visual representations of objects to their corresponding words.

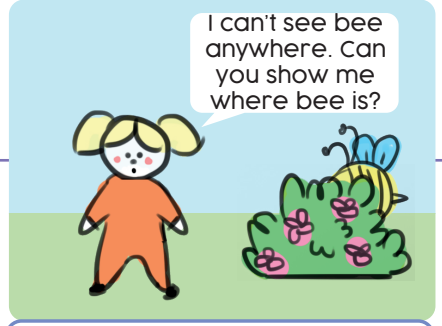
The child learns which auditory- and visual features are essential for recognizing a specific object

Story line response moment: Kiki is looking for somebody/something within the scene. However, she can't seem to find it, although the person or thing that she is looking for is partly hidden within the scenery (ex. bee hidden behind the bush). The person or thing she is looking for is the episode's central theme (ex. what is a bee). The object in question is covered in a way that only its distinctive visual features are visible (ex. wings, yellow and black stripes body, angle, antennas).

Kiki asks the viewer if they can find the person or thing she is looking for. The viewer gets some time to point towards the partly covered object. After that time has passed, a cursor will appear on the screen and points to the hidden object. After clicking on it, the object reveals itself. Kiki links the object's visual representation to its corresponding word. And she thanks the viewer for helping her.

Introducing to what object the character is looking for

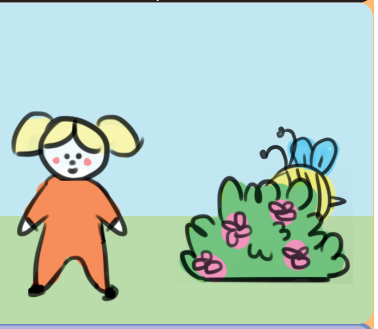
Let the viewer feel that they need to answer character's question



Attract viewer's attention towards to the mystery object in question

Ambient "waiting for response" music

By recognizing the object's auditory-visual features, the viewer gives a response



Ambient "waiting for response" music

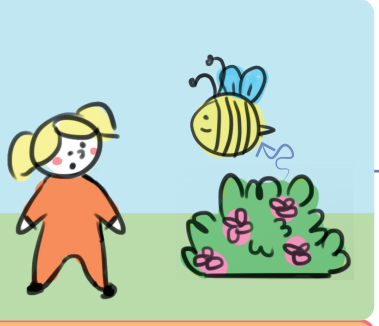
The viewer gets a hint what kind of response is required from them (pointing), by seeing the curser moving toward the hidden object

Ambient "waiting for response" music

Child voice-over gives cue what kind of response is required from viewer

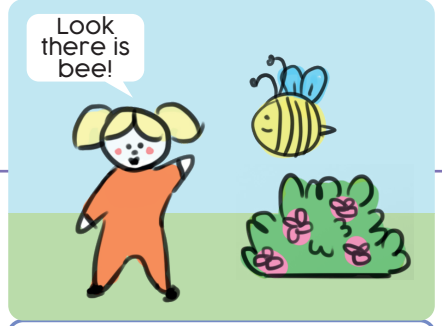
Ambient "waiting for response" music

Revealing the object by showing all its visual features



Uplifting "appearance of answer" sound

Linking the object's representation to its corresponding word



Integrate auditory-visual features in question to the whole object

Rewarding the viewer by letting them feel that their input was helpful

Figure 27 (right page)
Storyboard "Uncovering the mystery object" and what kind of effect each shot has on the child

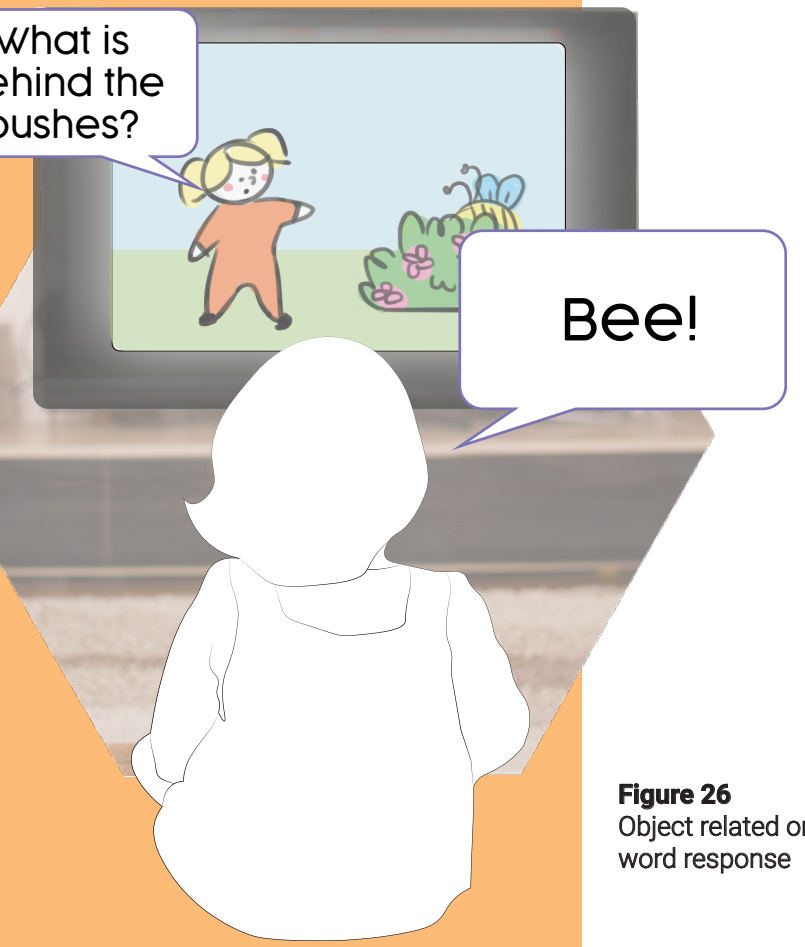


Figure 26
Object related one-word response

3.3.2 One-word responses: Uncovering the mystery object

Response type: one-word response

Suitable categories: animals, people, things

Opportunities for learning goals: The child learns to link visual representations of objects to their corresponding words.

The child learns which auditory- and visual features are essential for recognizing a specific object

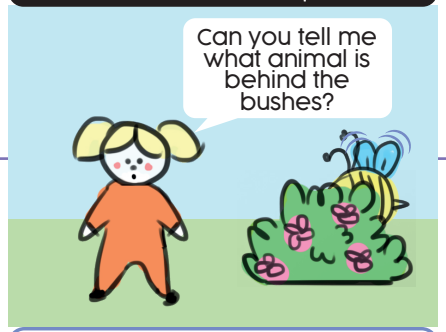
The child is stimulated to learn to speak novel words out loud, which improves speech.

Story line response moment: In this scene, Kiki hears a sudden noise and/or sees something moving that is hidden behind a certain object in the scenery (ex. a bee hidden behind a bush, or an elephant covered in mud). The hidden mystery object is the episode's central theme (ex. what is a bee?), and only some of its distinctive visual features are visible (ex. wings, yellow and black stripes body, angle, antennas). These features will serve as cues for the child to recognize what kind of mystery object they are dealing with.

Kiki wants to know what's behind the bushes and asks the viewer if they know what's behind the bushes. The child answers by recognizing the given auditory-visual cues. After some time, the mystery object reveals itself and Kiki provides the child with the correct answer by linking the object's visual representation to its corresponding word.

Attract viewer's attention towards mystery object's visual features

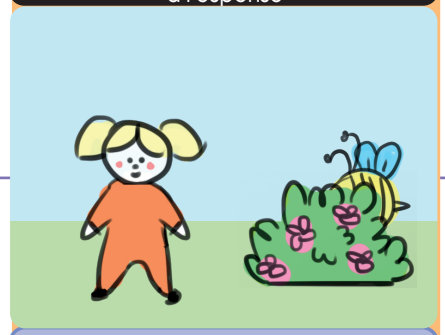
Let the viewer feel that they need to answer character's question



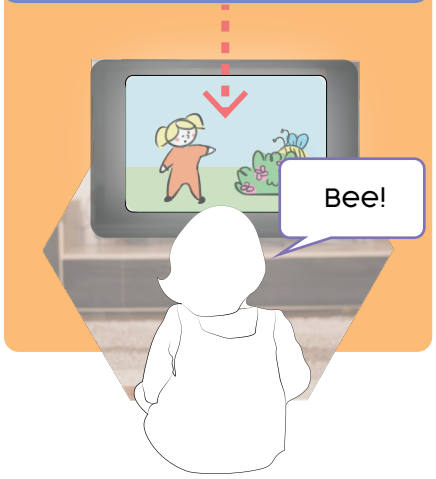
Attract viewer's attention towards to the mystery object in question

Ambient "waiting for response" music

By recognizing the object's auditory-visual features, the viewer gives a response



Ambient "waiting for response" music



Revealing the object by showing all its visual features

Uplifting "appearance of answer" sound

Linking the object's representation to its corresponding word

Integrate auditory-visual features in question to the whole object

Figure 29(page 57-59)
Storyboard "Yes or No game" and what kind of effect each shot has on the child

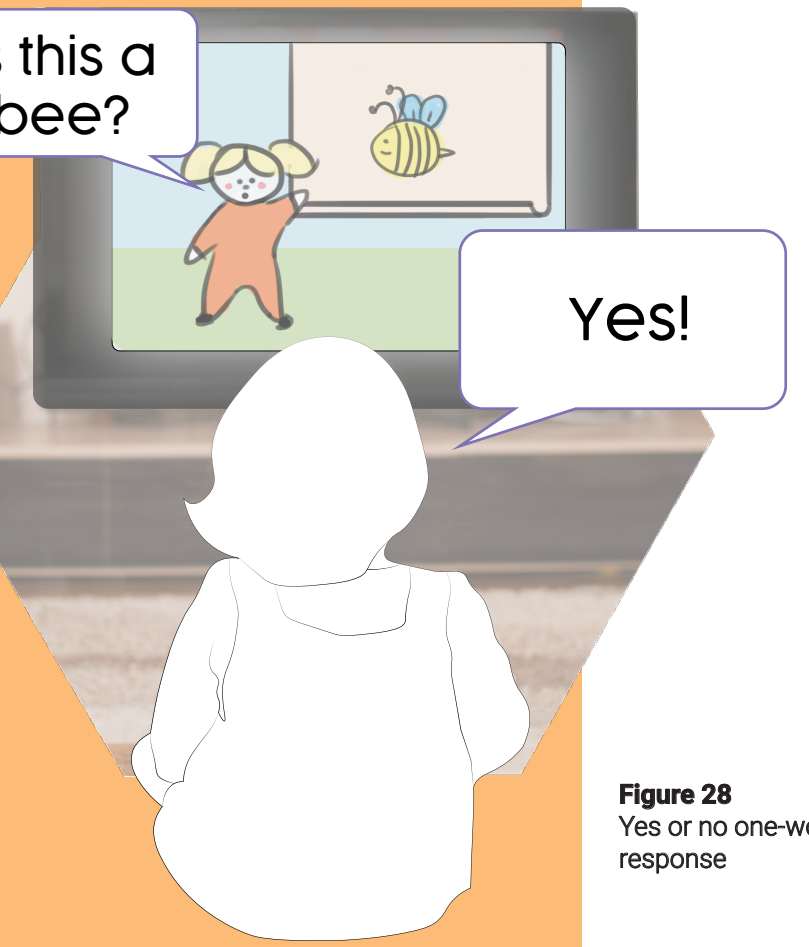


Figure 28
Yes or no one-word response

3.3.3 One-word responses: Yes or No game

Response type: one-word response

Suitable categories: animals, people, things, actions, situations

Opportunities for learning goals: The child learns to link novel words to their visual represenations

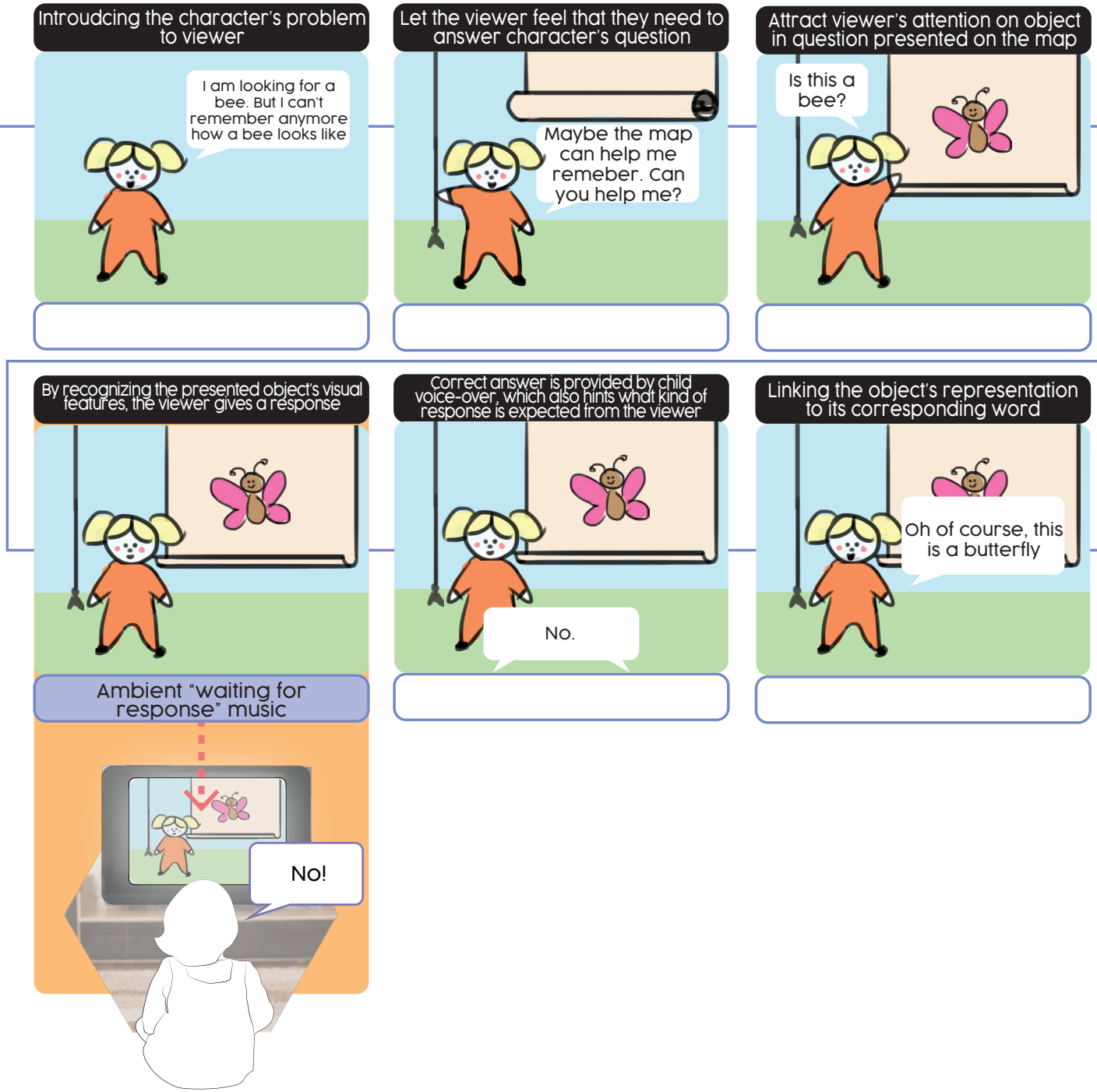
The child learns to distinct words and their corresponding visual representations from other words

When an action or situation is used as input for this response moment, the child learns how (not) to behave in a certain situation (Ex. Is this how a bee flies?).

Story line response moment: Kiki is trying to remember how a particular person or thing looks like, so she needs some help from the viewer (ex. Do you know how a bee looks like?). She opens the map, which shows a visual representation of an object. The viewer needs to answer if the presented object on the map is the object Kiki is looking, by saying "yes" or "no".

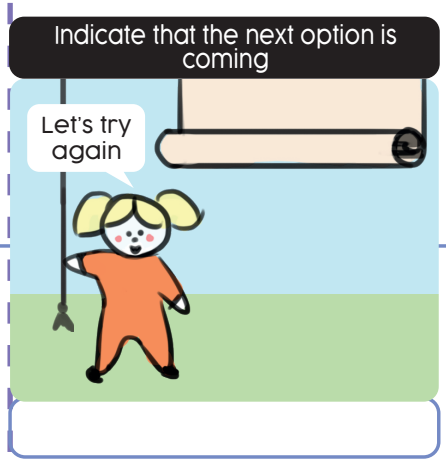
Eventually, the correct object shows on the map at the 2nd or 3rd try, which changes each episode. By switching up the number of times it takes before the correct object shows the map, the show prevents that the child will answer on automatic pilot (ex. no-no-yes). If the child knows the second try could either be a "yes" or a "no", they know they need to actively think about if the presented object is the object that Kiki is looking for.

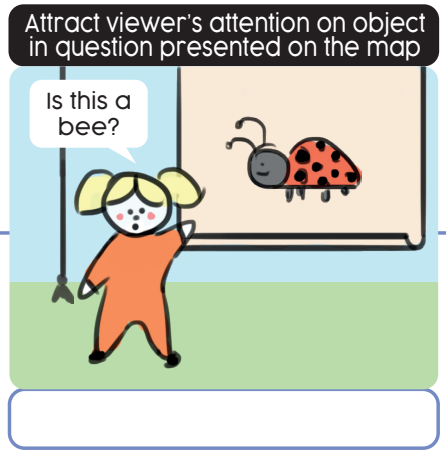
Alterations: This response moment can also be used for showing how somebody should behave in a certain way. For example, you could give three options for the question "Is this how a bee flies?". Two of them would be obviously wrong, which will lead to humorous moments within the series.

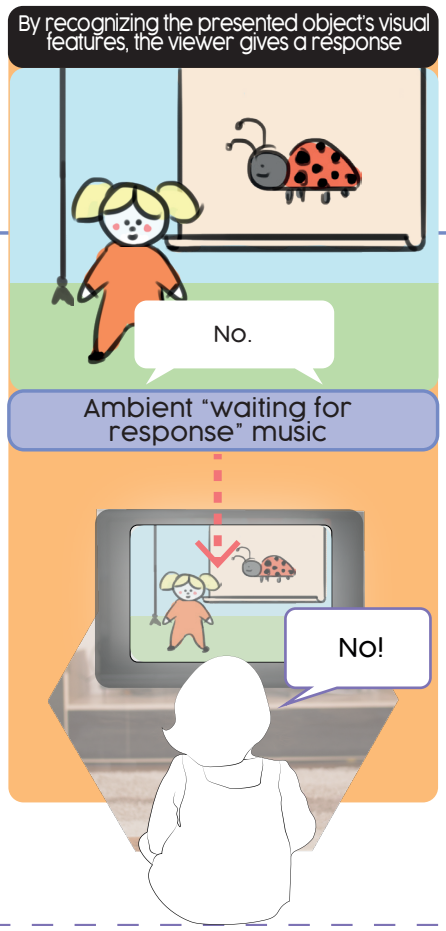

Introudcing the character's problem to viewer
I am looking for a bee. But I can't remember anymore how a bee looks like
Let the viewer feel that they need to answer character's question
Maybe the map can help me remeber. Can you help me?
Attract viewer's attention on object in question presented on the map
Is this a bee?
By recognizing the presented object's visual features, the viewer gives a response
Correct answer is provided by child voice-over, which also hints what kind of response is expected from the viewer
No.
Linking the object's representation to its corresponding word
Oh of course, this is a butterfly
Ambient "waiting for response" music
No!

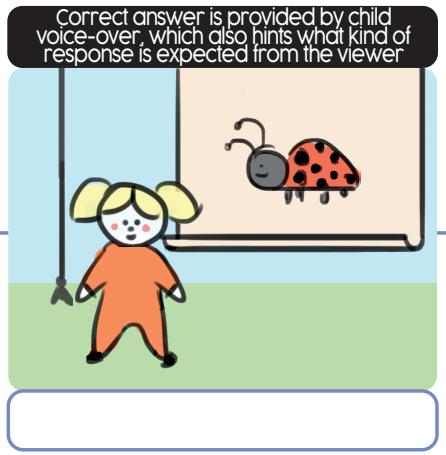
Optional

Alter the number of options between episodes to prevent an autmatic set of reply

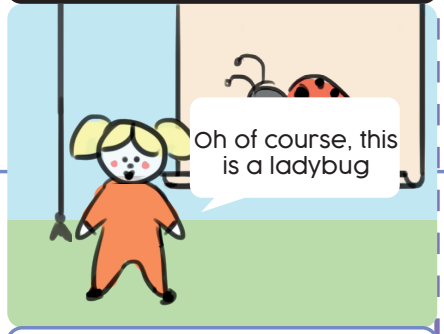






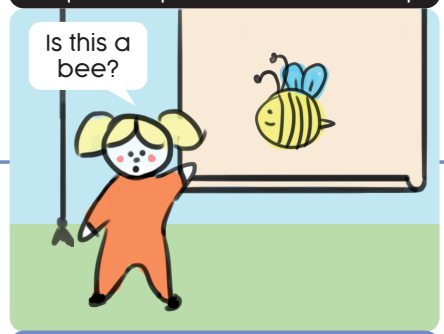


Linking the object's representation to its corresponding word

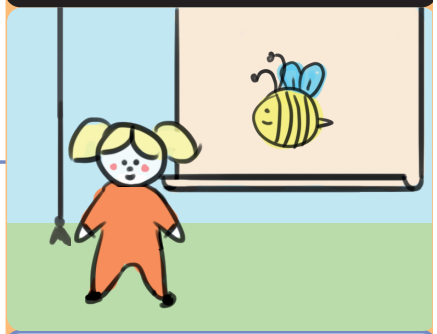


Indicate that the next option is coming

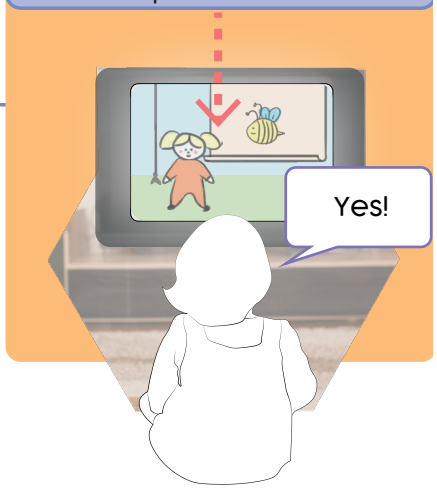
Attract viewer's attention on object in question presented on the map



By recognizing the presented object's visual features, the viewer gives a response



Ambient "waiting for response" music



Correct answer is provided by child voice-over, which also hints what kind of response is expected from the viewer

Linking the object's representation to its corresponding word.

Figure 31(page 61-63)
Storyboard "The helping hand" and what kind of effect each shot has on the child

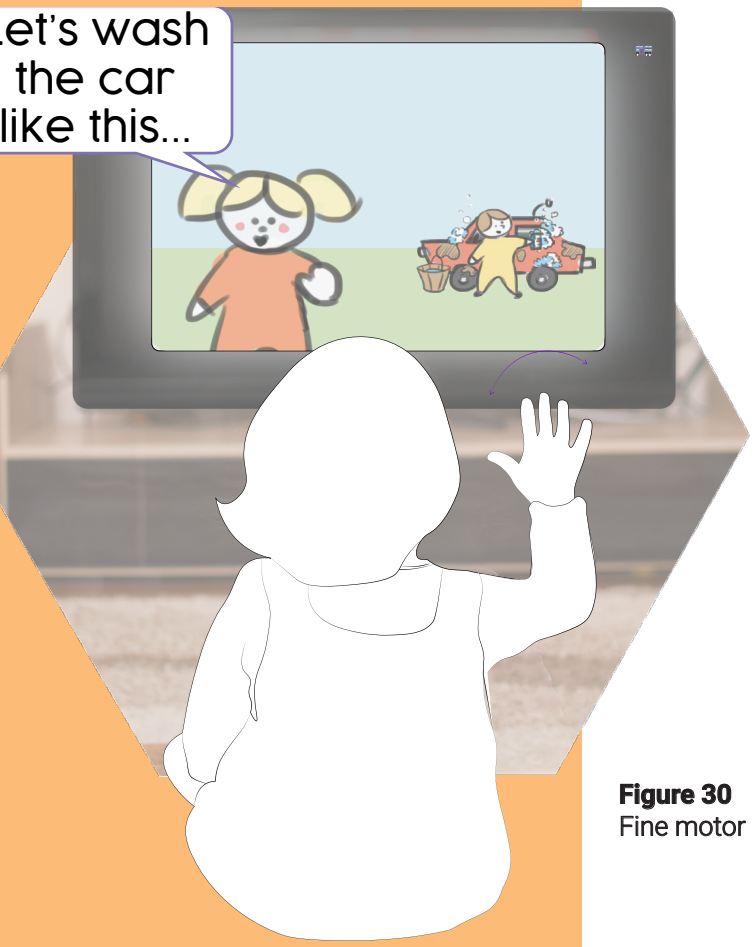


Figure 30
Fine motor response

3.3.4 Fine motor responses: The helping hand

Response type: Imitating by using fine motor skills

Suitable categories: animals, people, things, actions and situations

Opportunities for learning goals: The child actively learns the meaning of verbs (Ex. what does "washing" mean?):

- The movement of action
- What kind of effect the action has on an object
- Why you want to perform this action in specific situations

The child actively learns what kind of actions specifically belong to certain objects (Ex. What does a bee typically do? A bee flies in the air)

The child improves their fine motor skills by copying the movements

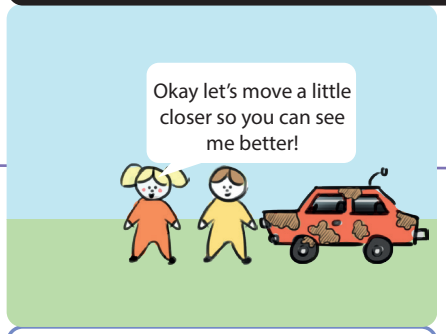
Story line response moment: The co-character in the story has a problem which needs to be solved (ex. the car is dirty). But there are no worries, since Kiki suggests an action as a solution which helps to overcome the co-characters problem (ex. if you wash the car, then the car becomes clean). The viewer needs to participate within the action by copying the movements from Kiki. If the viewer accompanies the movements of Kiki, the problem is solved in a better way (ex. the car is cleaned faster).

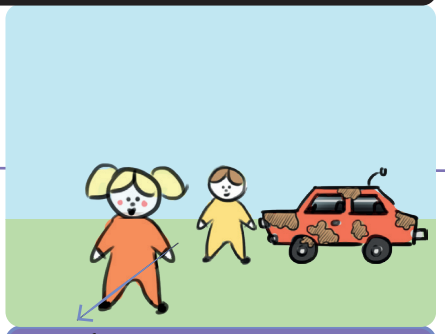
Charactre makes problem state clear to the viewer

Introduce an action as solution to reach desired state

Make clear to the viewer how their participation could improve the current situation

Put character in the right position so the viewer more able to focus on her movements





Uplifting "character moving closer" sound

Explain steps and tools needed to execute action

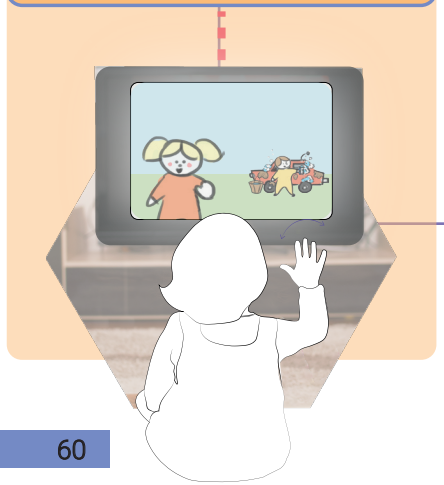
Explain steps and tools needed to execute action

Show the viewer the move to copy that corresponds the movement of action

Signal to actively participate + showing progress of active participation

Viewer copies move & sees how their movement makes impact on object in the background

Danceable moving music

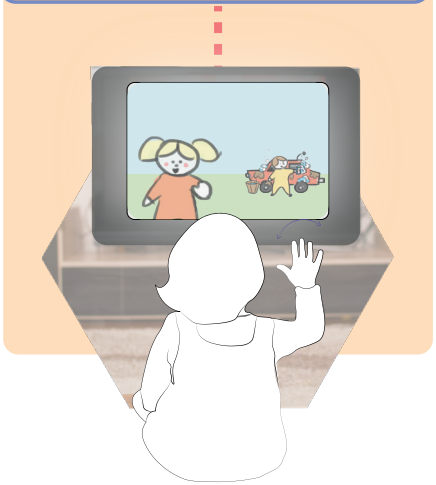


Adressing the effect of doing the action on object

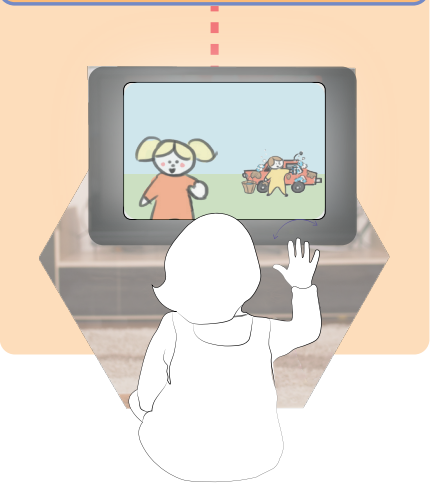
Signal to the viewer that he needs to actively copy the move again

Viewer copies move & sees how their movement makes impact on object in the background

Danceable moving music

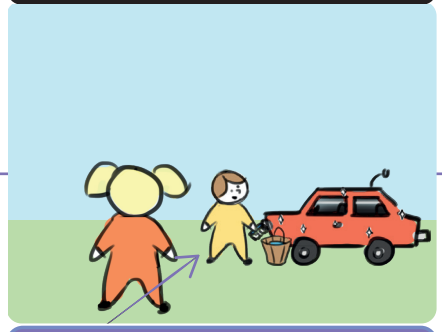


Danceable moving music



Attract viewer's attention on state change object

Moving character closer to object to let the viewer see the object up close



Uplifting "character moving" sound

Address how the action changed the object into the desired state

Rewarding the viewer by letting them feel that their input was helpful

4 Design episode builder

Introduction

In section 3, four different response moments were designed that can be used as edutainment within a series for toddlers. Each response moment revolved and teaches the child about one central learning theme, namely “what is a bee?” or “how do you wash a car?”.

However, how can filmmakers adjust these response moments to different central themes? Moreover, how can filmmakers embed these response moments in the episode’s storyline? After all, Pixifox Animation’s original goal was to create 52 educational episodes around different central themes easily. An “episode builder” should make it easy for the filmmaker to create a wide variety of educational episodes, by picking a central theme and create a storyboard around this theme through the help of the episode builder’s templates.

This section will go into more detail into the process of how the episode builder creates educational and entertaining episodes structurally, while still preserving the feeling that filmmakers can express their creativity.

4.1 Design guidelines episode builder

In this section, we take a more in-depth look at how the Pixifox Animations team was creating their storyboards' first drafts and evaluate their educational quality. This creates insights into which aspects of the filmmaker's process should be improved to increase the educational quality of videos. Based on this analysis, design principles are formulated for the episode builder's design should fulfil eventually.

When the Pixifox Animation staff created their first storyboards around several themes, it was not clear if the content fit the toddler's developmental needs. After analyzing the toddler's developmental needs and how they acquire meaning from objects and actions, it was concluded that the first storyboards were indeed too complicated for the toddler to understand. This was due to the following reasons:

- Too many events around the central theme were introduced within the episode. Which results in the toddler being overwhelmed with information;
- The central theme is explained in a setting which does not fit the toddler's environment, which makes it more difficult for the toddler to understand. This is because they need to make sense of two novel concepts instead of one. For example, it is easier to explain what a monkey is in a familiar setting, like a zoo, then in an unfamiliar setting, like a jungle;
- Some elements within the storyline were too complicated for the toddler since these elements take many steps to explain. Filmmakers should especially be aware of this problem when presenting an event in which the character is scared of something, which can be scary for the viewer as well. For example, the character being scared of bees since they can sting. However, if these kinds of events cannot be rationalized in a few simple steps, the topic itself is too complicated for the child to explain.

Although having many ideas about a theme is excellent, if filmmakers are not carefully selecting ideas for the episode, it can harm the educational quality of the video. In order for filmmakers to create educational value within their episodes, the design of the episode builder toolkit should, therefore, take the following design principle into account:

design principle 1

Designing an episode builder that guides the filmmaker into exploring and selecting essential features around a central theme which fits the level of complexity that a **1.5-3**-year old can understand, and translate these features into an educational storyboard, while meeting the parent's needs.

The design of the episode builder toolkit should also be practical for filmmakers to use. For example, Pixifox Animation wanted to fully produce a new episode every week, which means they would only have around half a day to brainstorm about a storyboard and then work it out in detail. This means that filmmakers should be able to create educational storyboards in an efficient and structural way. However, within the creative field, it is also important for filmmakers that they are still able to express themselves creatively. Once the educational value of the created storyboards has been validated, the toolkit should be able to be produced with the minimum amount of many economic and sustainable resources. In conclusion, the design of the episode builder should fulfil the second design principle:

design principle 2

Designing an episode builder which fits can practically be implemented within the creative process of filmmakers.

In order to achieve this design principle, the following design guides should be taken into account:

The episode builder helps filmmakers to create 3-5 minute long storyboards around a self-picked theme within a 4-hour time span.

The episode builder provides filmmakers with the right balance between 1) in being able to express themselves creatively and 2) structurally creating storyboards

From a sustainable and economic perspective, the episode builder uses the least amount of resources as possible.

4.2 Conceptualization episode builder

Based on the two main design principles from the previous section, a concept of the episode builder was developed, which contains five different types of paper templates. The templates should be used in subsequent order, and each template contributes in their own way in the overall process of transforming a central theme into an educational storyboard. Therefore, each template is marked with a big number, that corresponds with the step in the overall process to guide the filmmaker through the process. Whenever the filmmaker finishes filling in one template within the process, it takes the template's output to the next template, until a storyboard is created around a central theme as final output. Therefore the filmmaker must use each template correctly to ensure the educational quality of the storyboard. The overall process of the episode builder can be described in the following steps (see also Figure 32 and 33 and on page 68-69):

1. **Select a central theme** for the storyboard. The filmmaker can choose from several suggestions on the **theme list**.
2. Once the central theme is selected, the filmmaker will **explore the central theme's essential features** within the **brainstorm circle template**. These essential features are features that help the child to categorize and recognize a specific object, like "What makes a bee, a bee?". The filmmaker will explore features by asking questions like "How does a bee typically look like or sound like?" or "What does a bee typically do?". As a result, the brainstorm circle template will help the filmmaker to **create a clear overview of which features are suitable to include within the story, and which features are still too complicated** for a 1.5-3-year-old. From this overview, the filmmaker can explore different storylines around actions what the object typically does. This template is more focussed on expressing creativity then efficiency
3. The **brainstorm square template** allows the filmmaker to **create a base of the storyline, which will revolve around a typical action what the central theme does**. The filmmaker will choose one action that the central theme typically does from the overview of the brainstorm circle's template. Then, he will explore the action's features which are relevant for the child to categorize and recognize the action when watching the video. As a result, the brainstorm square template will help the filmmaker to **create a clear overview of in which steps the story should be delivered, which fits the level of a 1.5-3-year-old**. This part of the process will be more restrictive then brainstorming with the brainstorm circle template.
4. From this point, the filmmaker will start to create the storyboard. The filmmaker will begin the storyboard by starting to **create the response moment** first, which will trigger the child to learn about the central theme's features actively. The filmmaker can choose from four different **response templates**, which correspond with the response moments developed in Chapter 3. The response moment template helps the filmmaker to **select the essential features from both of the brainstorm tool templates, and integrate these features in the standard response moment's storyboard format**. This part will be the most restrictive part of the process.
5. The final step is to **create a coherent and interesting story around the response moment** by placing the response template between both ends of the **story templates** and filling the gaps with **shot cards**. The brainstorm questions on the ends of the story templates and response template will help the filmmaker to **complete the storyboard**. This part of the process will be most likely where the filmmaker can creatively express himself.

The following subsections will go into more detail on each template and how they convey educational value for the

design principle 1

Filmmakers are able to correctly fill in all of the episode builder's templates around a self-picked theme so the output will be an educational storyboard for a 1.5-3-year-old

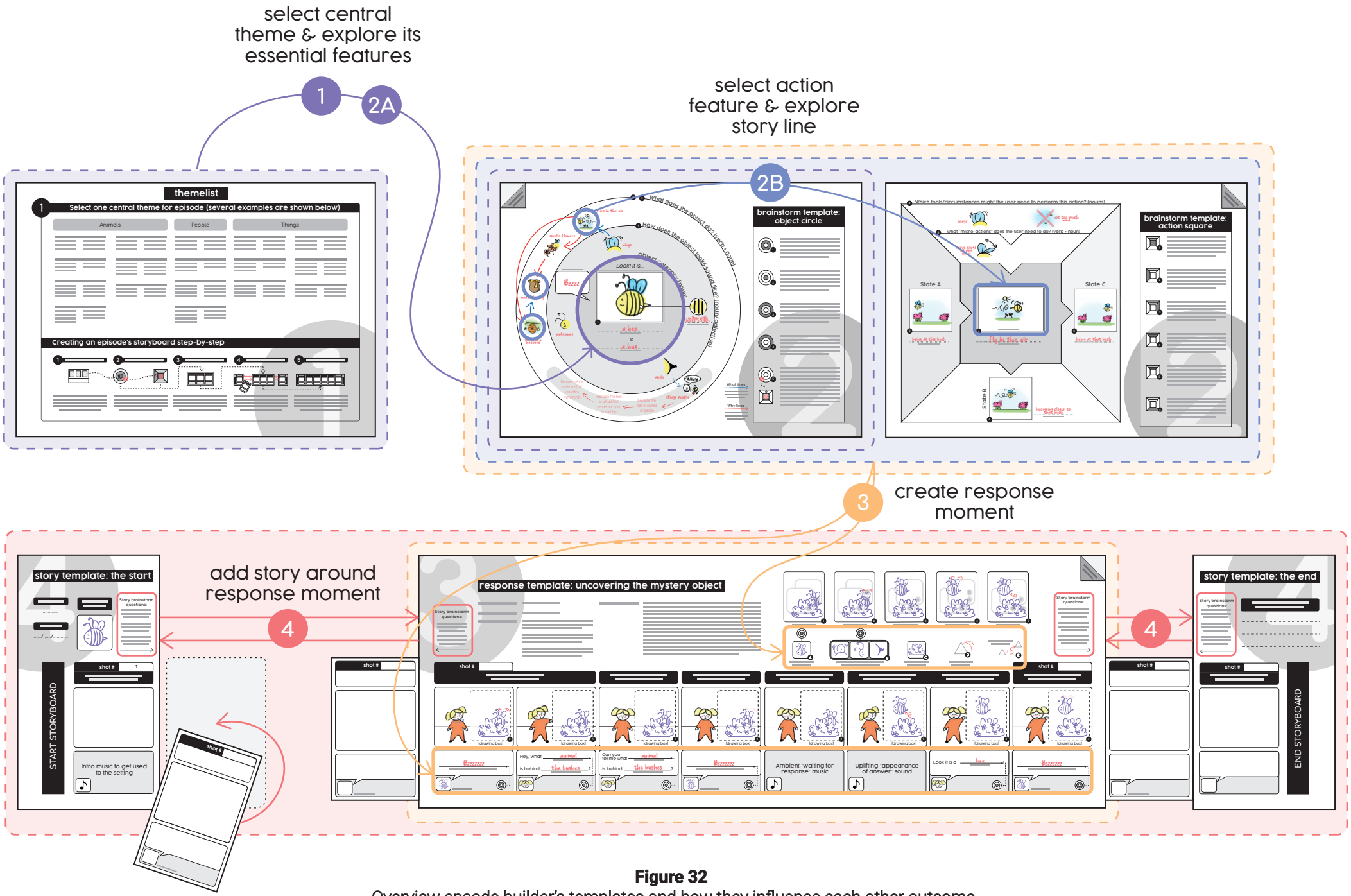


Figure 32
Overview epsode builder's templates and how they influence each other outcome

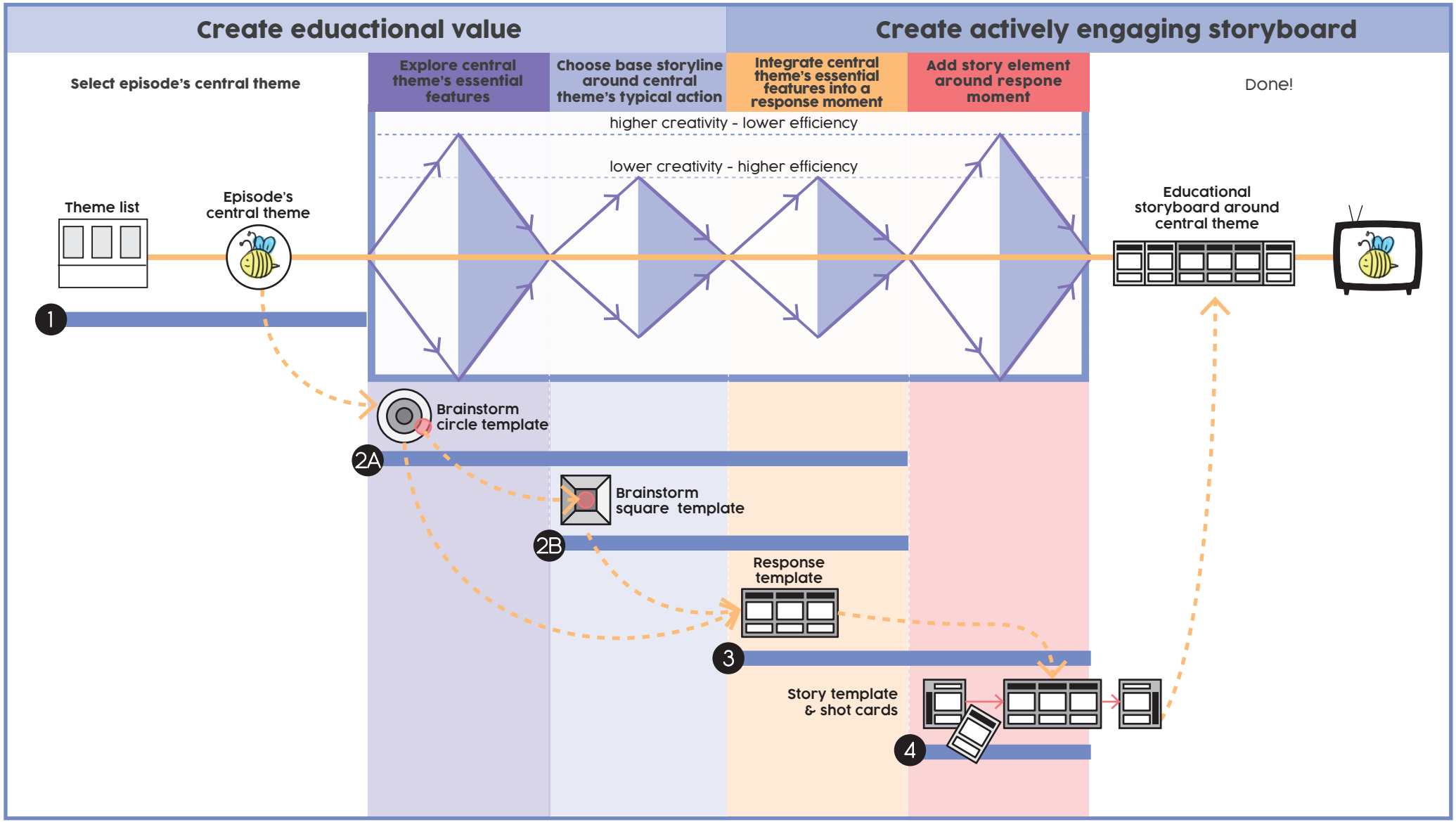


Figure 33
Process episode builder step-by-step and their main goals, and how creativity and efficiency are expressed in each step of the process

4.2.1 Theme list

template's main goals

- Inspire fimmaker to choose a central theme for the episode that fits the development of the child
- Inform filmmaker in which order the template should be used and what the purpose is of each template to create the episode's storyboard

how the template should be used:

The filmmaker needs to choose a central theme for the episode from which the child can learn about. In each episode, the central theme can teach the child one of the two following learning goals:

1. What a certain object is and what it particularly does, like a person, animal or thing.
2. Or the central theme can teach the child about actions which are involved when doing daily activities or events, like brushing your teeth or going to school.

If the filmmaker has no inspiration about thinking of a theme or has a little idea of which themes fit the child's development, he can choose a theme from the theme list. The theme list is the episode builder's template. Themes are divided into different categories to give the filmmaker an idea what kind of categories fit the level of the child's development. All themes are related to objects and activities which are close to the toddler's own environment, so the toddler can fit the novel knowledge to his current understanding about the world.

Once the filmmaker chooses a central theme, he can see which steps he needs to take next by looking at the episode's process overview at the bottom of the theme list.

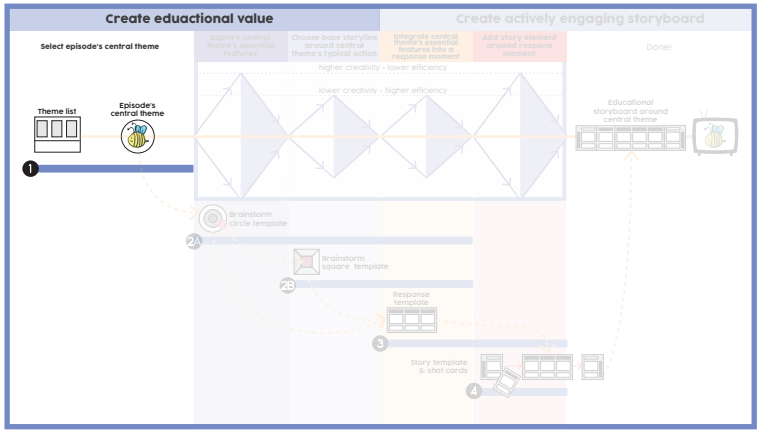


Figure 34
Current step in the episode builder's proces

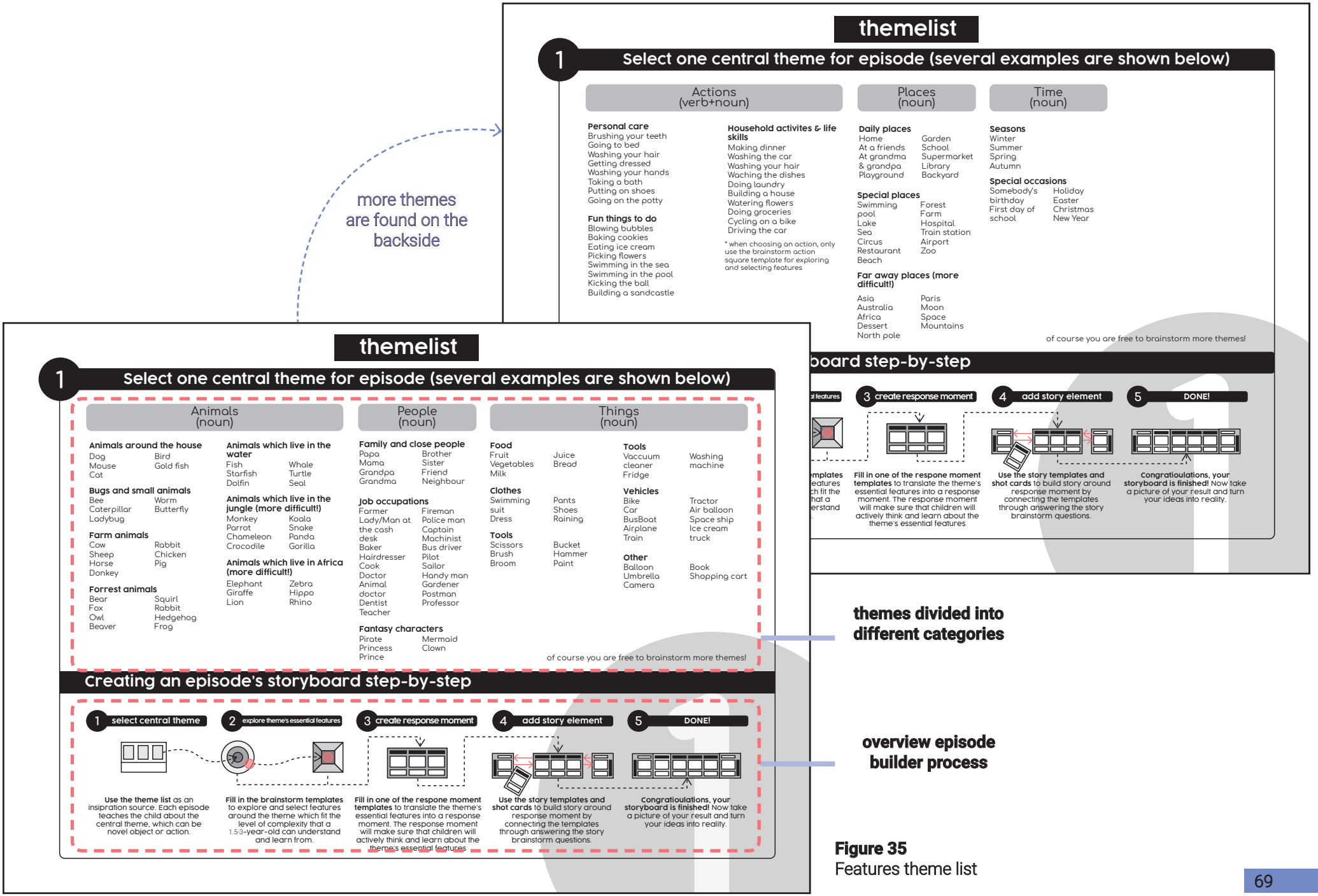


Figure 35
Features theme list

4.2.2 Brainstorm circle template

template's main goals

- Help the filmmaker to create a clear vision about which features are most effective to help the toddler to categorize a novel object (ex. animal, person, thing etc.)

how the template is used

When the episode's central theme is an object, like a person, animal or thing, then the filmmaker takes the circle brainstorm template and writes episode's central theme in the inner circle (see step 1). The circle brainstorm template helps the filmmaker to explore features that characterizes the chosen object on different levels. The brainstorming on features with the circle brainstorm template works similar to brainstorming with a mind map.

The filmmaker will start brainstorming on the object's audio-visual features in the second circle, which is closest to the inner circle (see step 1 and 2). The audio-visual features are in terms of shape, colour, texture and what kind of sound the object makes if applicable. This circle with the auditory-visual features is the closest to the inner circle since the child uses shape features as the first step to label an object.

However, using only visual features to label an object is often not enough for a 1.5-3-year, especially when they need to distinct two different objects which are similar in shape. Since toddlers label objects also on its function, the filmmaker will also brainstorm on things that the object typically does in the outer circle (see step 3).

After brainstorming on the object's action features, the filmmaker needs to select one typical action which the object does to revolve the storyline, so the learning goal is parallel to the story. The filmmaker can choose from the object's typical action which are easy to explain in several steps.
After the filmmaker selected an a typical action from the outer circle, the filmmaker takes this action to explore how it should be presented within the story in a way that the child can understand (see step 3 to 5).

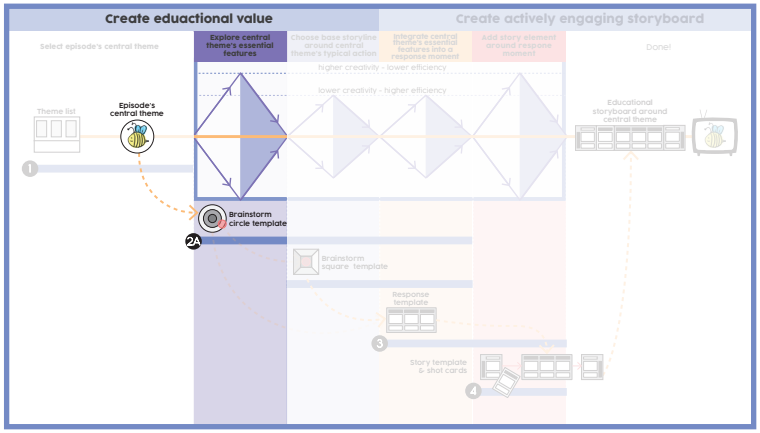


Figure 36
Current step in the episode builder's proces

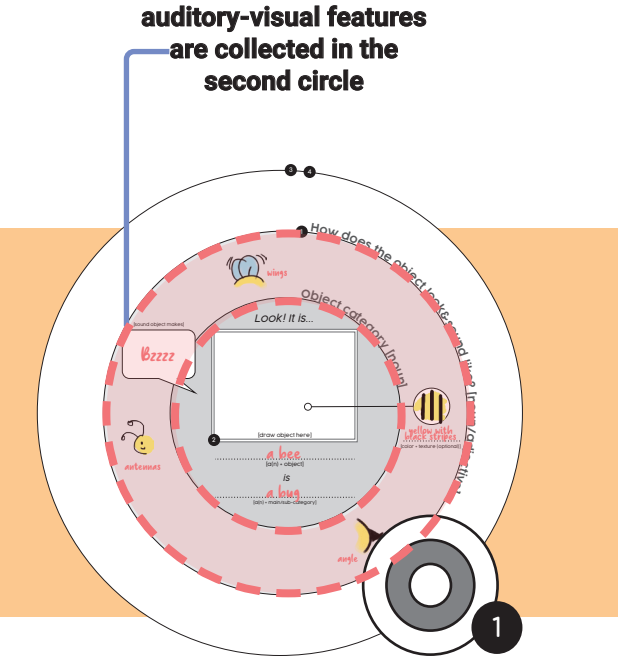
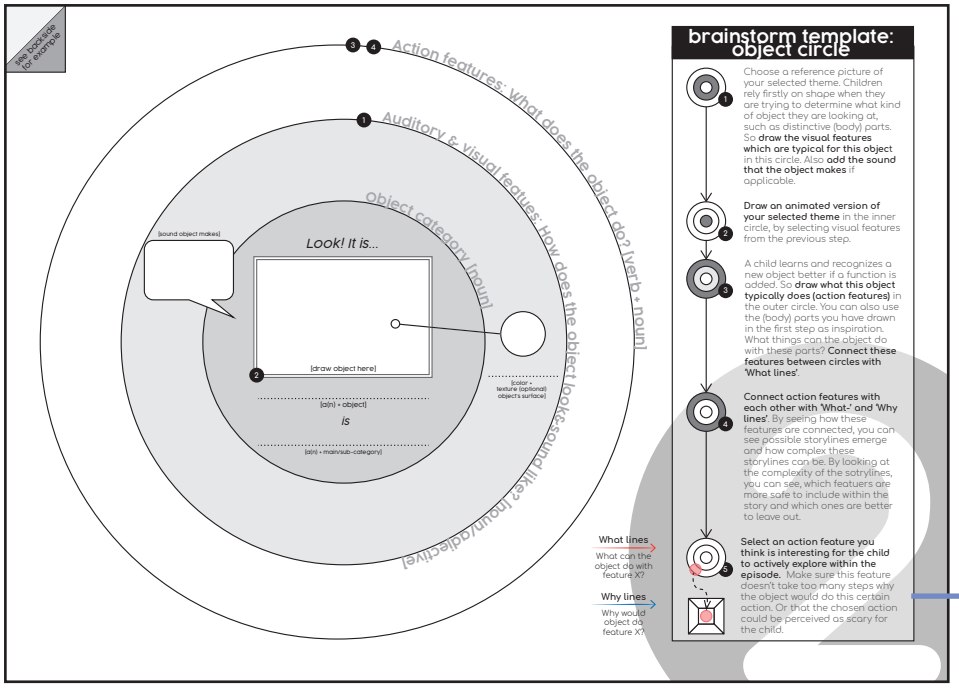
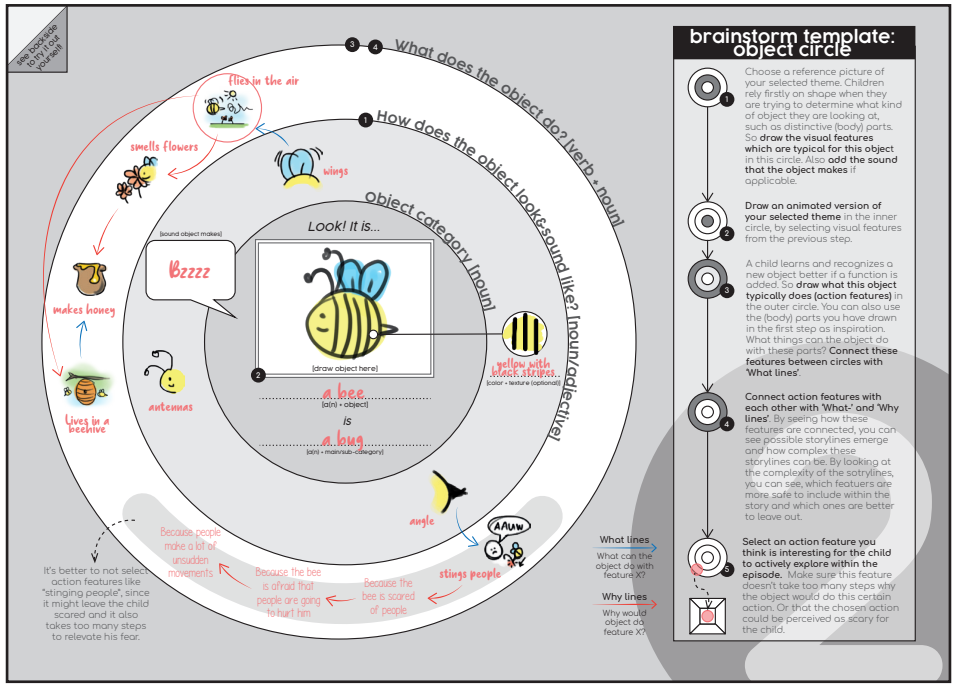


Figure 37
Features brainstorm circle template



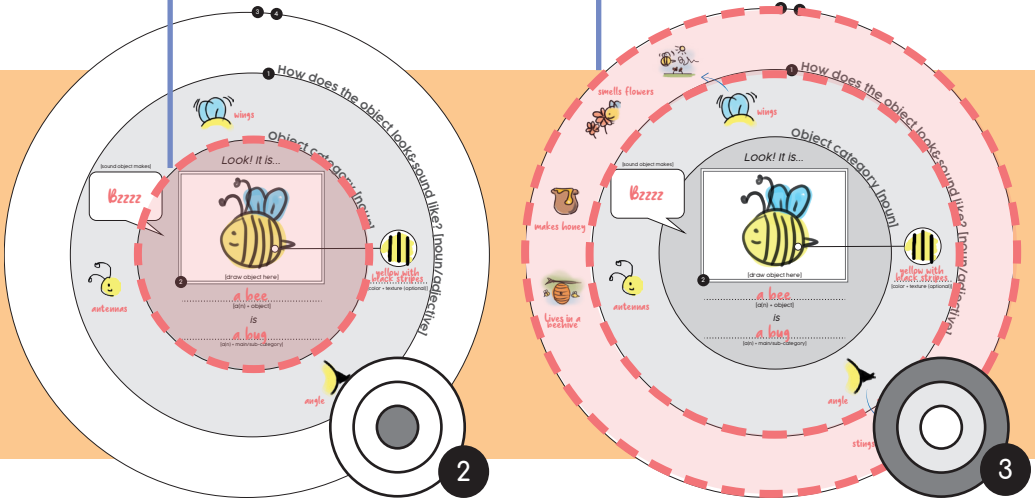


linking the 2D representaion its word in the inner circle

action features represented in the outer circle

instructions for the filmmaker to follow

selected action that will be explored in the brainstorm square tool



4.2.3 Brainstorm square template

template's main goal

- Help the filmmaker to create a clear vision about which features are most effective to help the toddler to categorize a novel action (daily activity or event.)
- Help the filmmaker to determine what the central theme is going to do within the story, which will be the base of the storyline.

How the template is used

The action and the object which undergoes the action are written down in the center of the template (see step 1).

The horizontal axis of the template desicribes how the action changes the state of the object which undergoes the action Storywise you could see the first state as a problem state, and performing the action can be seen as a solution to reach the desired state, in this case the end state. The filmmaker writes down in step 2 and step 3 how the state of the object which undergoes the action changes over time.

The vertical axis of the template (step 4 till 6) goes into more detail how the child should visually recognize the action by brainstorming on the action's "micro movements" and which tools and circumstances might be needed to perform this action. From here, the filmmaker can determine what kind of effect the action has on the state of the object (ex. when you wash a dirty car, the stains dissappear).

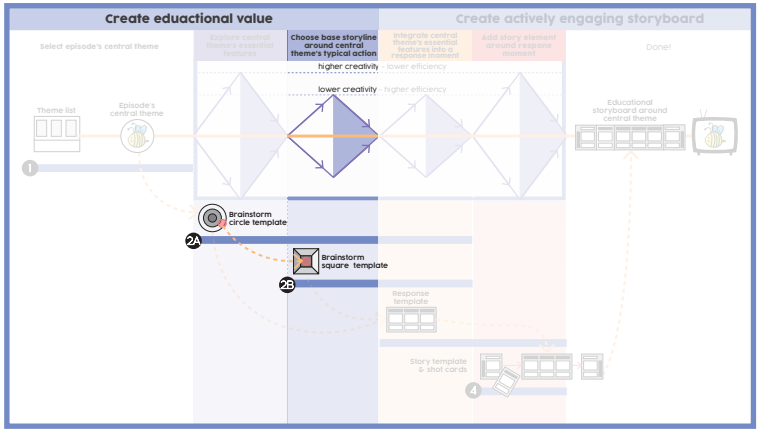


Figure 38
Current step in the episode builder's proces

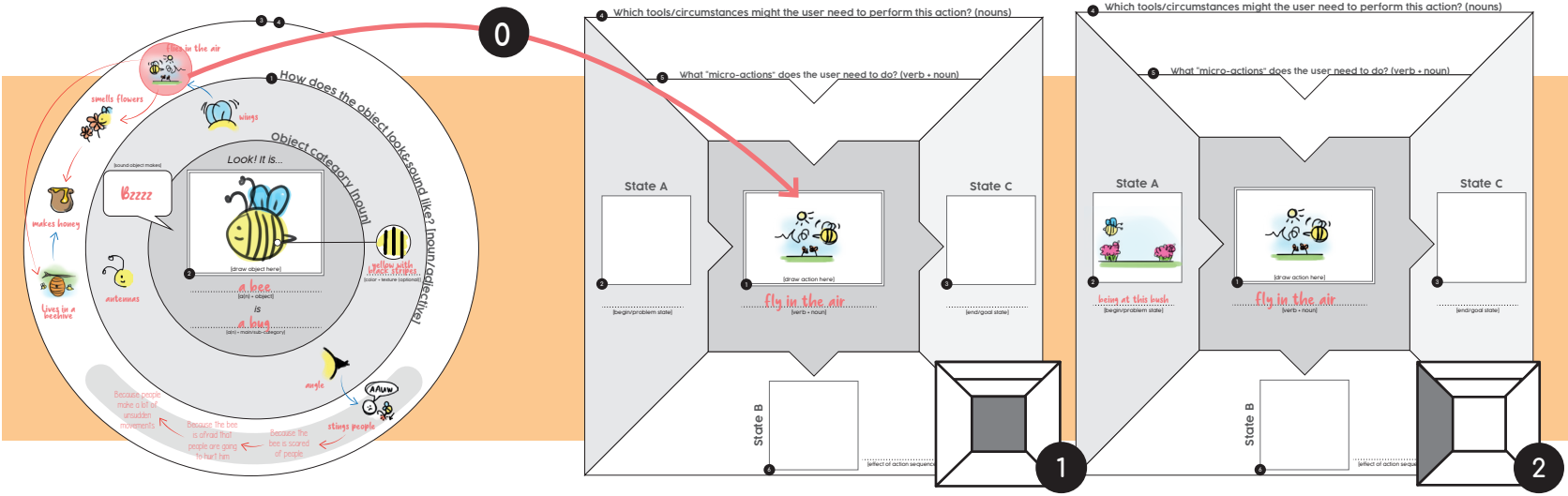
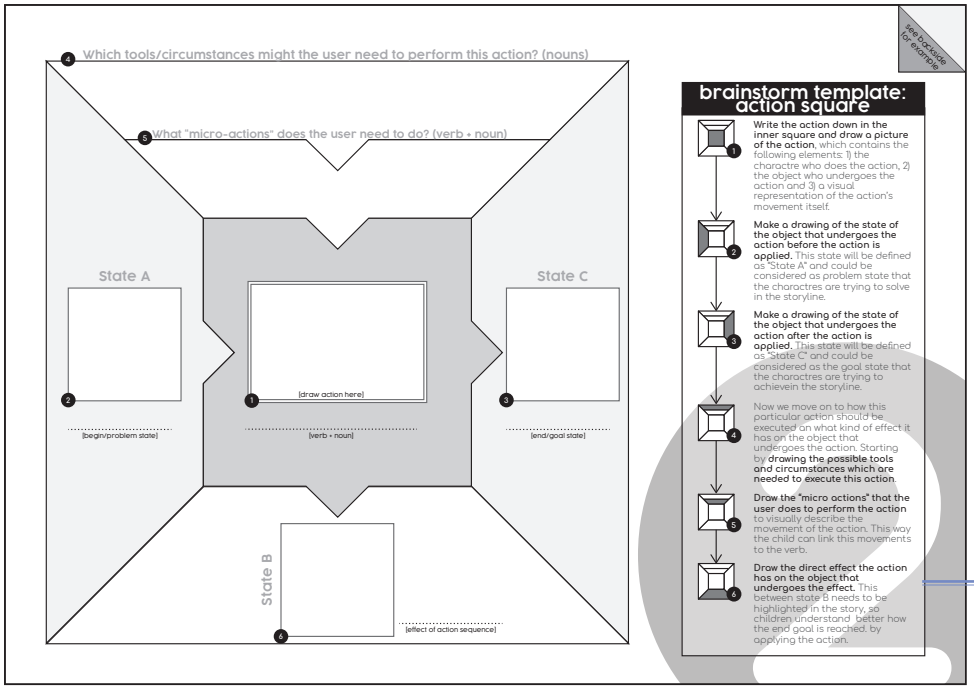
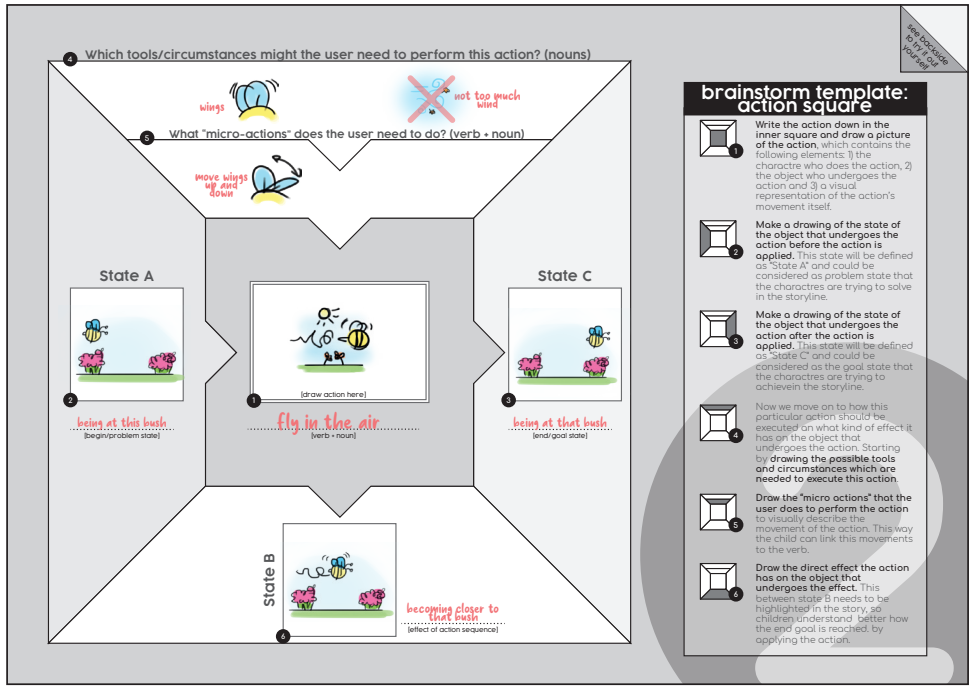


Figure 39
Features brainstorm square template

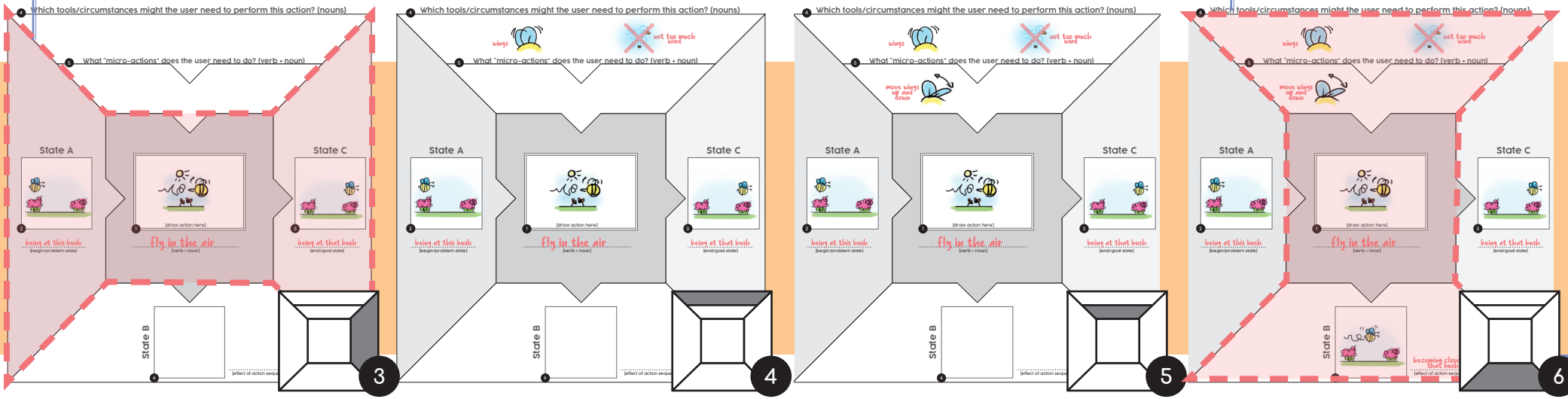




instructions for the filmmaker to follow

the horizontal axis explains how the action change's the object which undergoes the action ofver time

the vertical axis explains how the action visually looks like



4.2.4 Response moment templates

template's main goal

- Help the filmmaker to translate the central theme's essential features into a fixed storyboard format which will trigger the viewer to actively respond and learn about the central theme.

How the template is used

Once the brainstorm tools have been filled in, the filmmaker can choose from four different response types (see Appendix C.3), each teaching about the central theme in a different way. The response types

By using the outcome of the brainstorm tools, the filmmaker can select features and is guided what the characters are going to say in the auditory part of the storyboard (see step 1). Once all the textboxes have been filled in, the filmmaker is going to support the auditory part with finalzing the viusal part of the shots. To be able to guide the toddler's eye gaze to specific parts on the screen, the filmmaker needs to follow strict visual guides. The visual selection guides determine what kind of essential features need to be selected from the brainstorm features (see step 2). Then the copy-paste drawing boxes describe how these elements shot come together in a specific shot (step 3). Once the cope-paste-drawing boxes have been filled in, the filmmaker copies the drawings of the copy-paste drawing boxes into a their corresponding shot within the storyboard (see step 4). The response moment template is therefore some kind of fill-in story, to assure attract the viewer's attention in the right way and explain the novel knowledge in a meaningful way. It is also important for the child to have some kind of structure within the response moments over the episodes, so they know what kind of reaction is expected from them when the response moment appears.

Once all the shot are drawn, and the storyboard is completely filled in, the filmmaker is allowed to express his creativity again by starting to brainstorm about how to build a story around the response moment (see step 5). He gets help from the brainstorm story questions on the side of the template. On the left side of the template, the filmmaker needs to answer how the character could come accross this situation that is described in the response templates. On the right side are questions about how the story could possibly procede after the situation that has happened. These questions work together with the question from the Story template in the next step, and helpt the filmmaker to create a story from the beginning till the end.

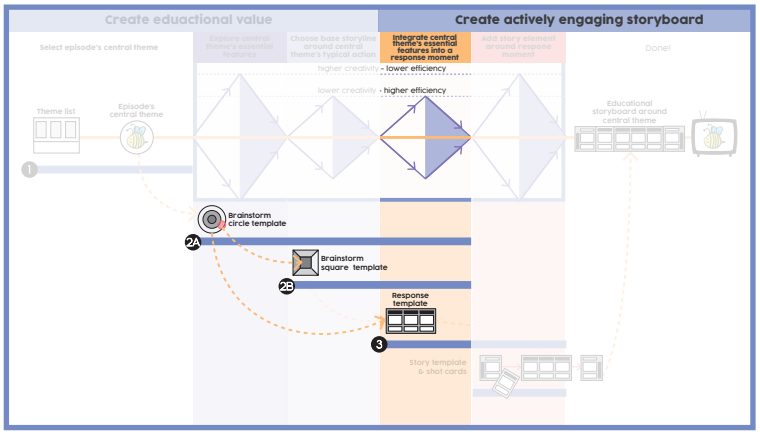


Figure 40
Current step in the episode builder's proces

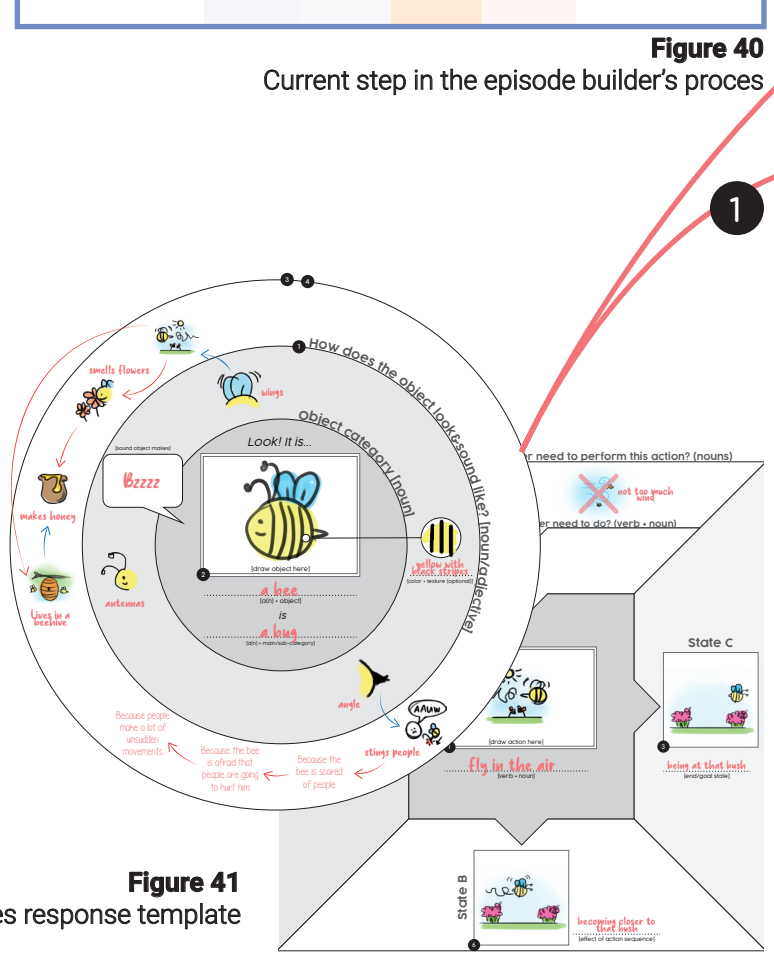
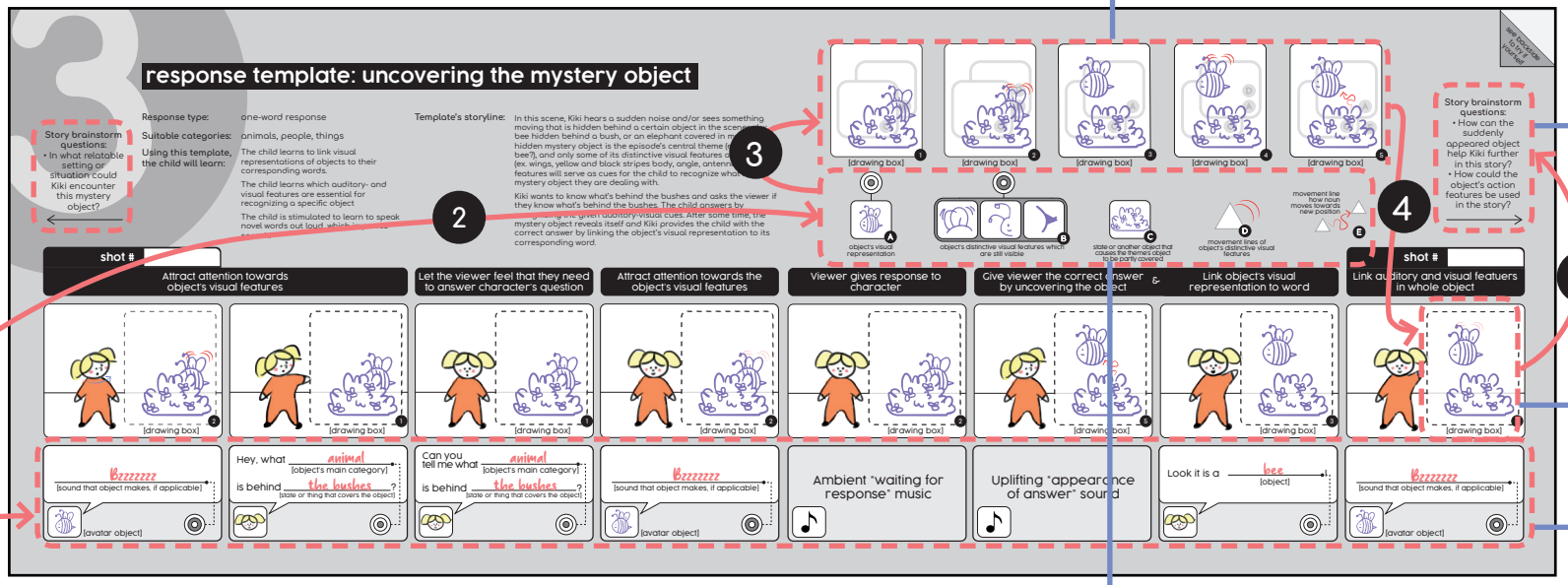
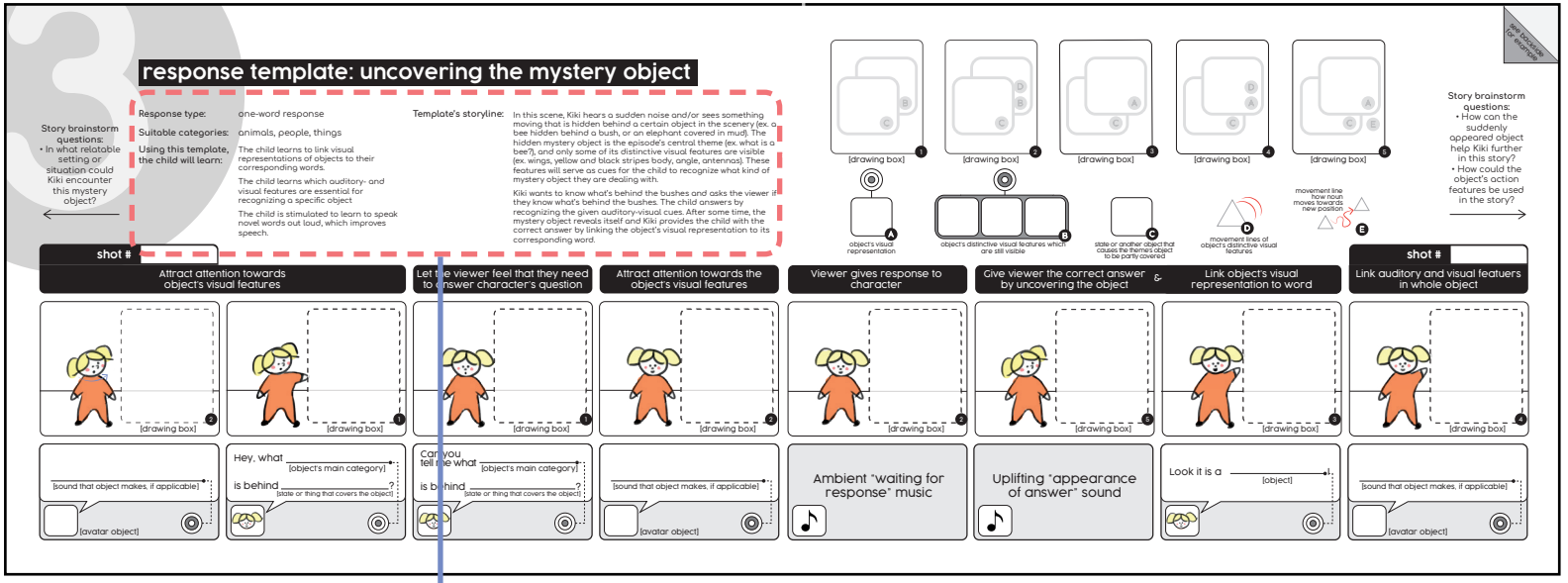


Figure 41
Features response template





copy-paste-drawing boxes for guiding how different visual features should come together within a shot

story brainstorm questions for inspiring to build a story around response moment

shot specific drawing boxes which determine the visual part of the storyboard. They are filled in according to their corresponding copy-pase-drawing boxes

dialouge textboxes which determine the auditory part of the storyboard. They have selection guides for filling in the blanks with central theme's essential features from the brainstom templates

visual selection guides for determining which of the central theme's essential features, derived from the the brainsorm templates, will be displayed within the shots

Info about how this response template contributes to development child and basic explenation of the story line

4.2.5 Story templates and shot cards

template's main goal

- Help the filmmaker to create a story around the response moment which corresponds with the toddler's current understanding of the world, so he can fit the central theme in his frame of reference.

How the template is used

Once the response templates are filled in, the flimmaker takes the two story templates end lay them at the beginning and at the end of the storyboard. Then the flimmaker takes the response moment and lays it in between the story templates.

Both the storytemplates and the response tempaltes have story brainstorm question on their end, which inspire to filmmaker to connect these templates together through shot cards. The story brainstorm question ensures that the central theme will be presented in setting which is logical for the character to encounter. For example will find a bee in the bushes in her garden when picking flowers. By presenting the central theme in familiar settings, the viewer can fit the novel information into his own frame of reference.

The filmmaker will fill in shot cards and lay them in between the response and story templates untill a full storyboard is created. The storyboard around the central theme is now finnished. A picture can be taken from it, so the content can be digitilized and go into production for actually creating the episode.

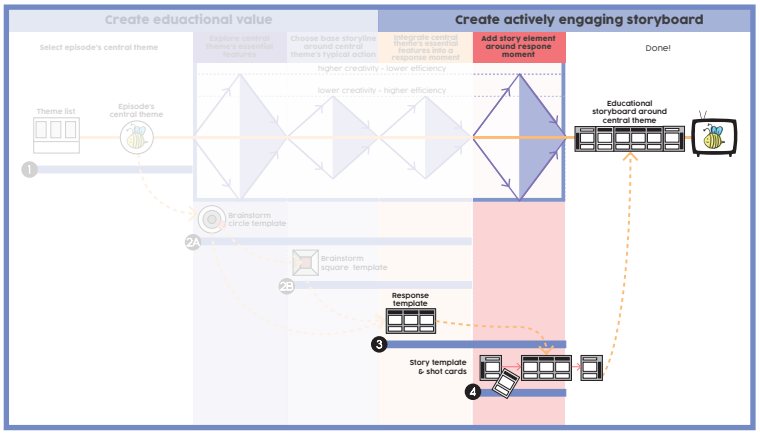


Figure 42
Current step in the episode builder's proces

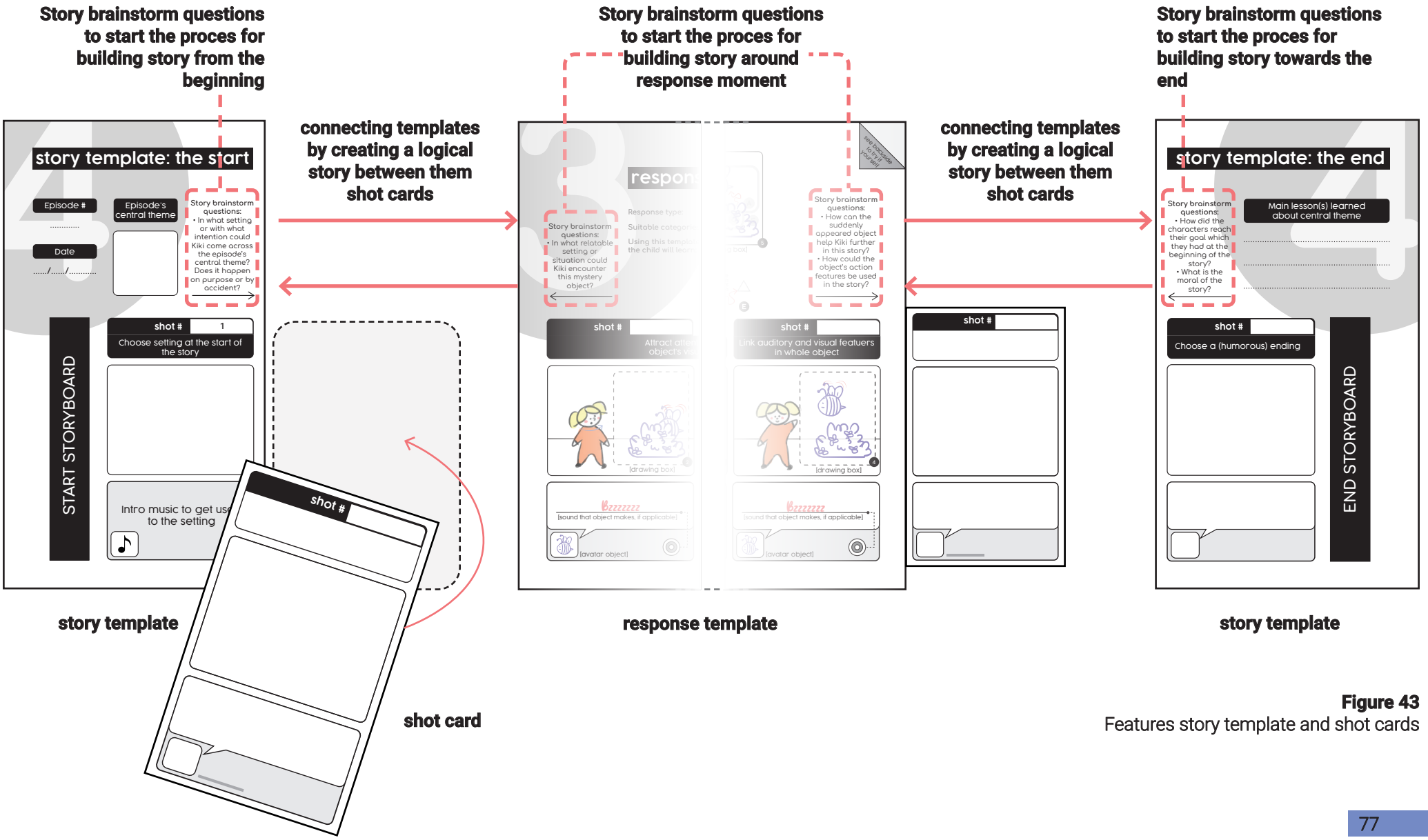


Figure 43
Features story template and shot cards

4.3 The episode builder as a paper format

Figure 44 shows an overview of all the episode builder's templates. Eventually, these templates will be printed out on A4 format and cut to their right size. Creating storyboards on a paper format has several benefits:

- Whenever a team of filmmakers wants to create a new storyboard, the paper format allows them to brainstorm and share ideas, rather than a digital or an online format. By sharing ideas, creativity is probably even more stimulated.
- Also, filmmakers might prefer paper mockup storyboards over digital storyboards, since paper format works faster. However, that also depends on the digital drawing skills of the filmmaker.

Eliminating unnecessary paper waste

Another feature of the episode builder is that all the templates are laminated. Since Pixifox wants to create 52 episodes, it would take a lot of paper resources if they were going to print all the templates for every episode they create. It would also cost a lot of time to prepare the materials. By laminating the templates and using 1.5 mm whiteboard markers, the templates become reusable by simply wiping off the generated content after finishing a storyboard.

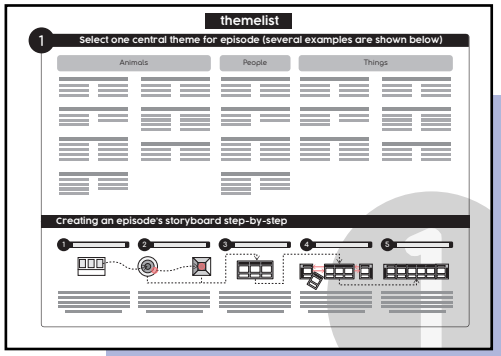
Another bonus of laminating the templates is that filmmakers are now able to correct their mistakes quickly.

However, it should be tested if the whiteboard markers don't smudge too much during the process, which means that filmmakers might lose their progress. It should also be tested if the filmmakers can draw the desired details in their storyboard with 1.5 mm whiteboard markers if the templates are printed on A4 since whiteboard marker don't come into a smaller size then 1.5 mm. Otherwise, the templates should be enlarged to A3 size. However, that will also take up a lot of space when creating a storyboard, which might lead to losing the overview.

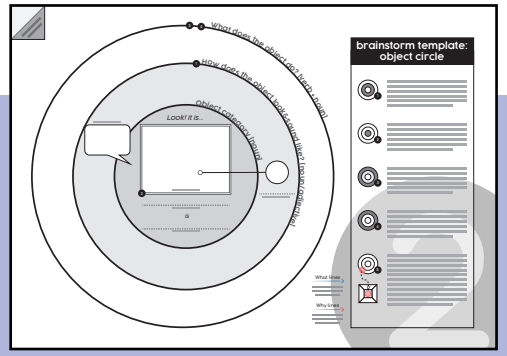
Figure 44
Overview episode builder's paper templates

overview “episode builder” templates

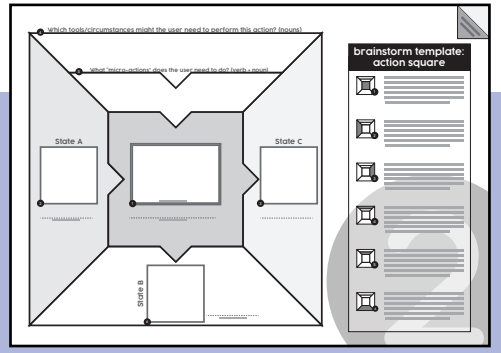
1 theme list

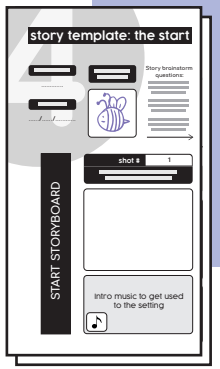


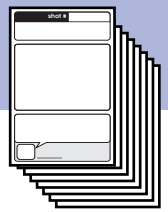
1 brainstorm template object circle

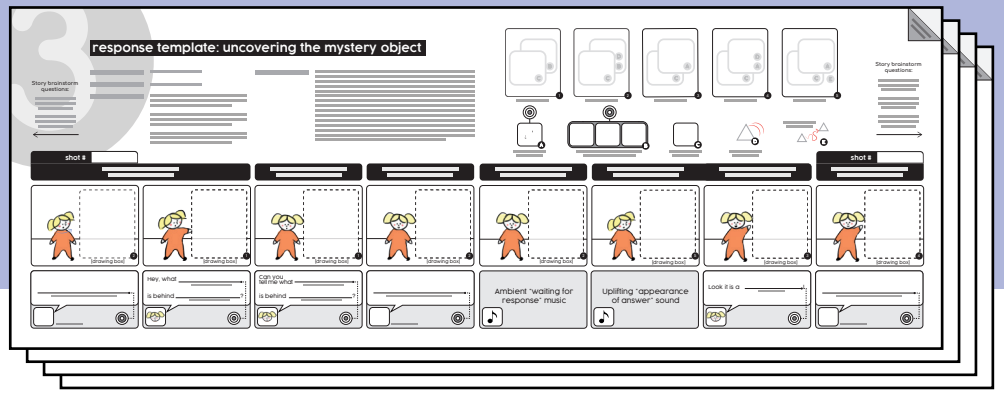


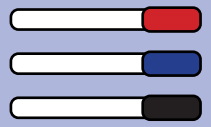
1 brainstorm template: action square











3 1.5 mm whiteboard markers in colors black, blue & red

2 different story templates

75 shot cards

4 different response templates

5 Testing

Introduction

This chapter describes the research set-up of the validation study. The key insights are presented following with an evaluation of the episode builder

5.1 Research set-up

To validate the episode builder's concept, a test was set up where participant got the assignment to create a educational storyboard around a self-selected theme, which contains one repsone moment, by using the episode builder's templates. The test is answering the following research questions:

- To what extent are participants able to correctly fill in the episode builder's templates around a self-picked theme so that they can create an educational storyboard for a 1.5-3-year-old?
- Does the episode builder help the participants to create 3-5 minute long storyboards around a self-picked theme under 4 hours?
- To what extent does the episode builder provide the participants with the right balance between 1) in being able to express themselves creatively and 2) efficiently creating storyboards?
- To what extent do participants like working with a paper tool to create storyboards without the use of digital tools?
- Can the laminated templates be reused when creating a new episode around another central theme?

Participants

For this validation study, six industrial design students of the TU Delft (five women and one man) between the 20 and 25 years old. One was a bachelor student, two were master students, and three were recently graduated within the past two months and had no job yet.

All participants had at least some experience with design for children. Three of them were more experienced with design for children by completing the elective Design for Children or their bachelor end- or graduation project had children as a target group. However, none of the participants had experience with designing for 1.5-3-year-olds.

Four out of six participants had experience in making videos for in their design projects. Only one of the participants had followed the bachelor elective 'Video for Designers'. All of the participants were familiar with the term "storyboard" and had some knowledge about different camera angles, like close-up, zoom and pans.

Three tests were executed in groups of two. Each group had at least one participant who was more experienced in Design for Children, and one person who was more experienced in making videos.

Method

In groups of two, three tests were executed which tested each template of the episode builder's toolkit. The participants got the assignment that they together needed to create a storyboard through the help of the episode builder's templates. The storyboard would tell a story that would teach a 1,5-3-year-old about a central theme, which the participants select themselves. Furthermore, the participants got the instructions that the storyboard should 1) contain 1-2 response moments, 2) the story itself would be 3-5 minutes long and 3) should fit the level of complexity that a 1,5-3-year-old can understand. By executing the test in groups of two, the researcher was able to hear 1) the participants' thoughts about how they should use the templates, and 2) if the participants get inspired by the templates for creating a story.

The test was divided into three phases: an introduction, the testing of episode builder's templates, and evaluation (see Figure 45). Each test took around 115-140 minutes. To evaluate the educational value of the episode, under the assumption if the templates deliver the same output for which they are designed for, then the participants create an educational storyboard. Therefore, "output goals" were set up for each template, which is evaluated during the test. These output goals are highlighted as the red text in Figure 44. The participants had to use the templates by their own as much as possible. The researcher only intervened if the participants didn't know what to do next, or when the participants were using the templates in a way that it sabotaged the next steps in the process.

The participants worked with laminated templates which they could write on with 1.5 mm whiteboard markers in various colours. By llaminating the templates, participants were able to correct their mistakes, but the templates could also be reused for the upcoming test. Both of the brainstorm templates and the response templates had a filled-out example on their backside. All examples were centred around the central theme "bee". This way, the participants could get an idea of how one particular template could be from use for the other.

The test took place in a meeting room in the Labs Café at the campus of TU Delft. The templates were laid down on the table, as shown in Figure 44. Due to coronavirus, some extra measures had to be taken. One of them was that the participants and researchers were seated from a 1.5-metre distance. If the participants gave permission, the testing of the episode builder templates was recorded on video, and the interview was recorded on audio, both for later analysis.

Figure 45 (right page)
Overview research setup, containing test procedure and sub-research question per template.

1
introduction

presentation **5 min**
project context, developmental abilities 1.5-3-year-olds, test assignment, storyboard characters, 3 videos showing how toddlers respond when watching tv

identifying participant's experience **5 min**
experience with design for children and/or making videos

2
testing episode builder templates

creating storyboard **75- 90 min**

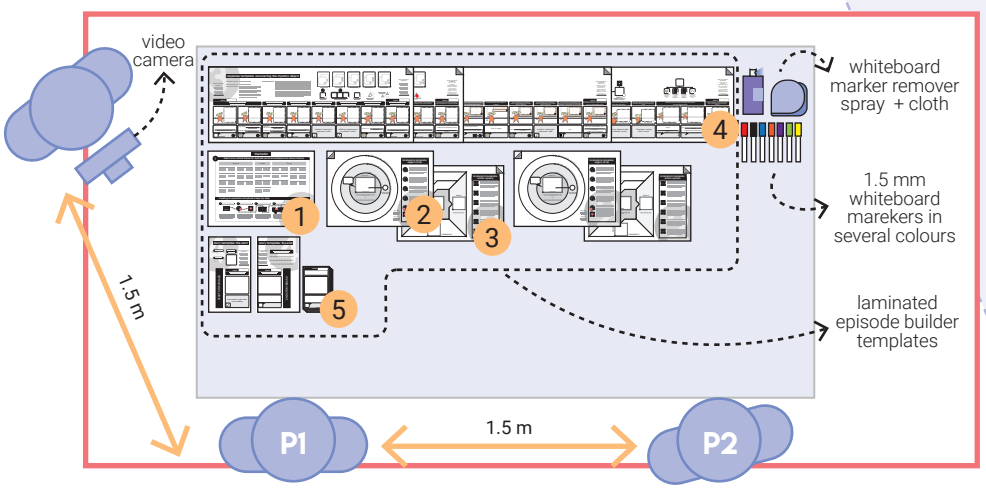
1. pick theme from theme list
2. fill in brainstorm template: object circle
3. fill in brainstorm template: action square
4. choose & fil in one of the four different respons templates
5. connect respons template with story templates through shot cards

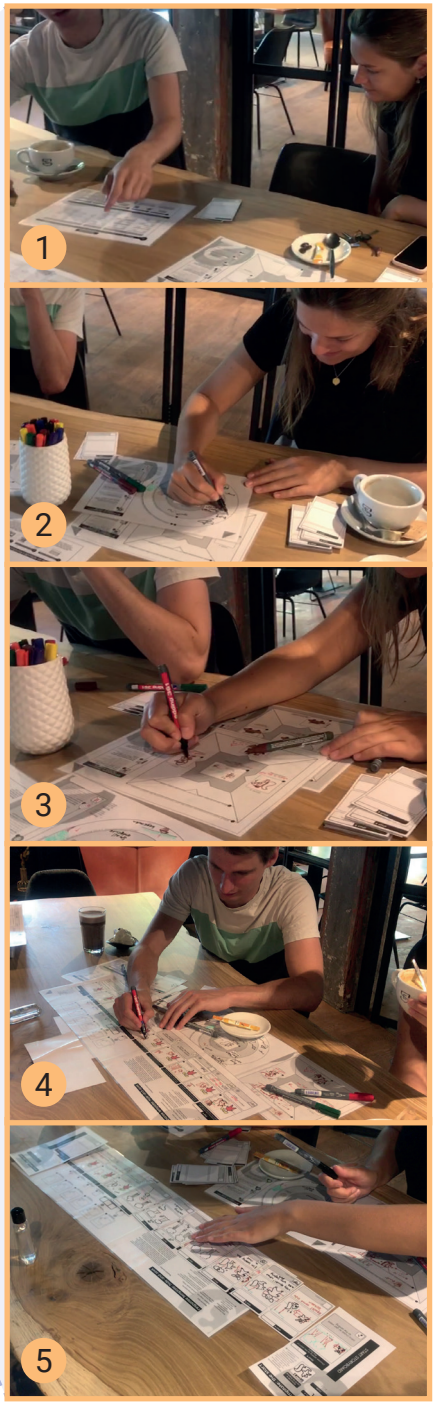
3
evaluation

interview **20- 30 min**
discussion led by interview questions based on research questions (audio recordings)

questionnaire **10 min**
For each template and the episode builder in general, the following questions were asked (7-Likert scale): 1) the extent efficiency is epxressed and if the participant is content about it and 2) the extent the participant is able to express his creativity and if the participant is content about it?

115-140 min





pick theme from the theme list

After observing the overview of all the tools of the episode builder, the participants need to decide which template they need to pick first, which is, in this case, the theme list.

Together, the participants need to decide what the central theme of the episode will be. They can pick one of the theme list's themes if they want to.

A second outcome of using the theme list is if participants understand what is overall expected from them when they read the instructions of the episode builder's overall process displayed at the bottom of the template.

fill in brainstorm template: object cirlce

Participant's place the chosen central theme in the centre of the circle. As an outcome, they need to brainstorm features which are essential to characterize the central theme.

Another outcome of this template is that the participants choose an action feature which is 1) characterizing the central theme and 2) not too complicated to explain to a 1,5-3-year-old. They fill this action feature in the centre of the action square, which is the next template they should use.

fill in brainstorm template action square

The participants fill in the central theme's action feature in the centre of the action square. The outcome of this template is that participants should fill in all the boxes of the template correctly, so they have 1) a shared idea what the central theme is going to do within the story and 2) a shared idea how to display the action in the video correctly.

choose & fill in one out of the four different response templates

The researcher explains the differences in stories and types of responses between the templates. From there, the participants should choose a response template which they think they fit best for their story.

As an outcome, they need to fill in the response template as complete as possible by using the brainstormed features from both the brainstorm templates. The selection guides should give the participants the right idea which features they need to select from the brainstorm templates and integrate these features into the storyboard.

connect the response template with the story template through shot cards

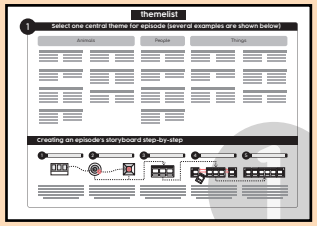
Participants should create a story around the finished response template by placing the response template between the "begin" and the "end" story templates. Subsequently, they should complete the storyboard by filling the gaps with filled-in shot cards in an way that the story is coherent, interesting and 3-5 minutes long.

The brainstorm questions on the ends of the response and story templates should give the participants inspiration about how they can make a coherent and interesting story.

5.2 Key insights

Based on the observations of how the students were using the templates, the created storyboards, and the evaluation sessions, key insights were summarized. For each research question, results are presented and illustrated with quotes of participants. Results of the storyboards are shown in the Appendix D.4

To what extent are participants able to correctly fill in the episode builder's templates around a self-picked theme so that they can create an educational storyboard for a 1.5-3-year-old?



theme list

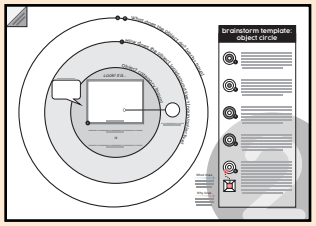
All participants were able to select a central theme they find interesting for the episode, which also fits the developmental level of a toddler.

All the participants were able to figure out in what order the templates should be used by connecting the template's numbers to their corresponding steps in the instruction. However, **participants were not able to create a clear vision about what outcome is expected for each template and why this outcome is important for the next template**. Especially the why they had to fill in the action square is unclear to the participants in the beginning, while they later realize that the action square is quite important to determine what the central theme is going to do within the story.

*"P5: I don't have an overview of all the steps, because it is too much to take it all in. When doing this *points to theme list*, it would be nice if you know what you are going to do with it in the next steps. Eventually, you will get there. [...] But I didn't know where to look for. Now that I know that, and if I would do this another time with another central theme, then I would instead pick a theme from which I know that will work and know that it will be a nice theme."*

Participants' suggestions for improving their expectations about how each template transforms the central theme into a storyboard a bit further:

- Feed spoon the steps that need to be taken (paper or digitally)
- Someone who demonstrates all the steps with one central theme
- Experience with the episode builder toolkit.



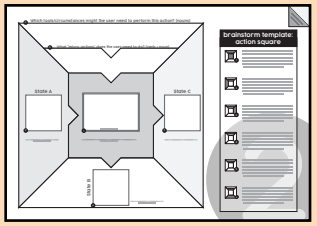
brainstorm template: object circle

All the three the groups were able to explore the central theme's typical visual and action features by using the brainstorm circle.

The four participants who explored the template by reading the example were quicker to fill in the template than the group who only read the instructions. The example gave these participants insight what is expected from them. All three the groups agreed that **the instructions are probably not necessary to fill in the template, since there is an example on the backside**. In combination with the example, the participants perceived the instructions even somewhat confusing or distracting. However, the participants did find the instructions' information useful since they do want to know why they should execute certain steps within the template. Therefore, the **participants rather see the instructions' elaborate information in another form, like a workshop or instruction manual**.

The participants find the brainstorm circle's outcome very insightful for selecting story elements that 1,5-3-year-olds can comprehend. The features they discovered and selected were even more simple than they expected. Participants therefore perceived this step as essential determining which elements can be involved within the story.

Finally, **the participants liked selecting the action feature around the central theme, since it gives them a focus on what the central theme is going to do within the story, and therefore create a base for the storyline**.

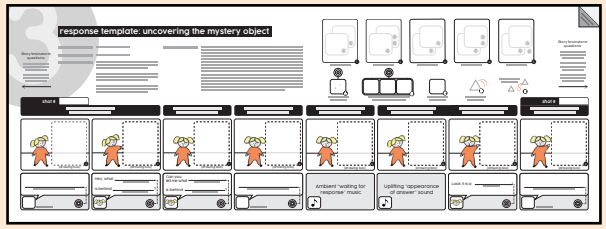


brainstorm template: action square

Just as the brainstorm circle, all participant knew how to fill in the action square template by mainly looking the filled-in example on the back and the questions on the borders, instead of reading the instructions on the side of the template.

All participants were able to write down the state's descriptions for the beginning state A, intermediate state B, and the end state C. However, they did not draw the object which undergoes the action and how its state changes in the corresponding drawing boxes. Instead, the participants used shot changes towards other objects or zoomed to specific parts of what is happening to the object. These shot changes were also visible within the storyboard of one group, which would cognitively burden a toddler when he is trying to comprehend a new action.

All groups stated that they found it interesting that the micro-actions did them more actively think about how to highlight the action's motion within the storyboard. Only one group expressed the action's motion within their storyboard. This is because they were the only group that chose the "Helping hand" response template, which explicitly asks the user to integrate these micro-actions into the storyboard. However, time constraints might also be a reason why the other two groups were not able to highlight the action's motion within their storyboard since their storyboards were not on such a detailed level already.



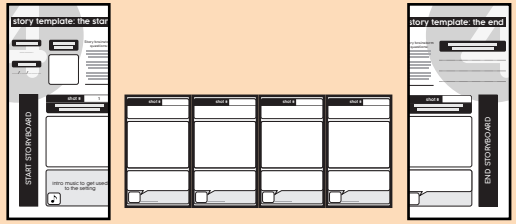
response template

Without any guidance, all three of the groups started to fill in the textboxes first. Participants were able to correctly pick features from the brainstorm templates to fill in the text boxes of the response template.

After these textboxes were filled in, the participants started to freely draw elements in the shots without using the visual selection guides. Within these freely drawn shots, participants used several changes in camera angles and type of shots. Despite they knew that these changes would cognitively burden the viewer more during the response moment. Therefore participants must be more guided in how they can visually set up their shots without changing the camera angle.

However, two out of three groups were not even aware that they were supposed to use these guides to select features from the brainstorm templates, so they can determine what visual elements should be drawn in the shots until the researcher told them. The visual selection guides were overlooked because the response template does not give the participants clear guidance about in which order the different areas on the template should be filled in. Participants had a hard time to identify all of the response template's elements and their goal at once since there were many different elements to identify. The participant's eye was naturally drawn to the storyboard, so they considered everything within this area as a starting point.

Since there were so many different elements shown on the response template, all three of the groups overlooked the story brainstorm question on the ends of the response template as well. After pointing out the story brainstorm questions on the response templates, the participants introduced new ideas about how to build a story around the response moment.



story templates & shot cards

Due to time restraints, connecting the story templates with the response template with the shot cards was less tested than the other templates. Participants were not able to build a 3-5 minute story around the response template since getting to know and filling in the previous templates took already quite some time and energy. In an ideal situation, the participants would have done another test where they fill in the previous tools more quickly, since they already know what they need to do. Therefore the participants have more time to spend on creating the story around the response template in the end.

However, the participants did manage to build a small story around the response moment by using the brainstorm story questions. It made the participants actively think about how the main character would encounter the central theme in a plausible setting, and how they could together get involved within a story.

Does the episode builder help the participants to create 3-5 minute long storyboards around a self-picked theme within 4 hours?

Each group created a storyboard around a specific central theme within 75-90 minutes. At their first use, they were able to fill in both of the brainstorm templates within 35 minutes on average. Within this time, the participants were able to determine which of the central theme's typical features they were going to teach the viewer and what the base of the storyline will be. Most time was spend on reading the instructions, especially when the participants were trying to fill in the object circle first. All groups stated that if they were to create another episode, reading the template's instructions would not be required.

Participants spend the remaining time on creating the storyboards. 2 out of 3 groups completed their storyboards within their response templates over 90%. However, only one group filled in the visual guidelines as well, and therefore filled in the response template completely. Since two out of three groups were not able to fill in response moments in the correct way, it is not easy to indicate how long this phase within the process would take. However, after spending 34-40 minutes on filling in the response template, the participant had a clear enough idea about what their filled-in storyboard communicates about the story. So the participants could move on to the next and final step, building a story around the response template.

After filling the response template, the participants had already spent most of their energy, since the whole process was a lot to take in and the room was quite hot due to the weather. Therefore all participants spend a relatively short time of 10 minutes on average on building a story around the response template with the story templates and shot cards. Since it was their first time using the templates, and they had a maximum time of 90 minutes, none of the groups was able to create a storyboard between the 3-5 minutes long. Within the time of 38 to 53 minutes, participants were able to produce storyboards which would have been between the 62 and 90 seconds long.

Suppose participants would have no time limit and were more experienced with the templates. In that case, it is predicted that participants would take between the 2-3.75 hours to create 3-5 minute long storyboard around a self-picked theme (see Appendix D.3).

Does the episode builder provide the participants with the right balance between 1) in being able to express themselves creatively and 2) structurally creating storyboards?

When getting to know the templates, all groups agreed that it takes a long time to understand the process of the episode builder in its whole. Especially when reading the instructions on how the templates should be used took a long time. However, all groups agreed that if they would create a storyboard with the templates another time, that they could complete these templates much faster. Since they know what type of outcomes are expected from them, which also provides structure over the episodes.

P1: "We were doing this for the first time, so you think that it takes a long time, especially when you are going to read everything. However, if you have done this once, then you can imagine that a dog needs food, or that a hairdresser cuts hair, so you can easily replace it with another theme. And that offers a lot of structure for an episode."

Two out of three groups did not have the feeling that they could completely go loose with creativity, but they felt they were able to express some creativity when brainstorming on the central theme's features in the brainstorm object circle. One group felt that their creativity was restricted during most of the process, except when creating the story around the response template. Nevertheless, all the groups agreed that it is a good thing that they were held back with their creativity at times since they find it is a necessity of making the story not too complicated for children. One participant stated that the toolkit should be automized as much as possible when one is not able to express himself creatively. This need was especially expressed when filling in the response template, which involves many repetitive steps.

P2: "I think the tool is about understanding children, which results that you can't go loose with your creativity. Because you do not want to make it too complicated. This tool helps you to make it not too complicated, but it does not stop you in generating new ideas."

P4: I liked creating the story around the response moment because you are free to create an introduction. I think I liked that the most or liked it more than filling in and drawing the shots all the time.

*P3: Yes, I liked that too. But if I imagine myself doing this *points to response template* multiple times, instead of focusing on that freedom, you could also ask yourself how we are going to automize this process, so it will take less time.*

The episode builder helped them to create an understanding about which of the central theme's typical features a 1.5-3-year-old is able to understand.

P3: When I was exploring the central theme's features, I had something like "Ah were it should be at this level". This template is a good indication for that indeed. That is also my critique on papers as a designer, I think you can derive more value from these kinds of examples.

At times, participants were unsure how creative they were allowed to be when filling in different templates, which resulted in the first group felt they had to hold back in exploring features in the brainstorm circle. While the other two groups took too much freedom when creating the storyboards withing the response templates.

P2: "And it is good to emphasize that you are allowed to think freely when filling in the brainstorm template. That you can be free at first, and you can converge later. Because then you can express your creativity more."

To what extent do participants like working with a paper tool to create storyboards without the use of digital tools?

All groups expressed they rather liked to draw on a paper template then digitally since they are more skilled in drawing on paper and therefore can work faster. However, one group expressed that drawing on paper loses some of its value when participants need to draw the exact same elements within the response template over and over, which takes a lot of time. Automizing the process of drawing these repetitive visual elements by an online tool or reducing the number of repetitive drawing boxes on the response template were proposed as solutions by this group.

P3: I often had the feeling that I was doing double work. And I was drawing "ugly" so to speak. You don't want to spend much time on drawing. This is a useful tool, but if you do this more often, then you don't want to do this.

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*P4: How nice would it be if you draw something in here *points to the visual guideline response template*, and it would automatically fill in here *points to the corresponding frames in the response template's storyboard. That would have been very nice for an online tool.*

The paper templates provide the participants with a more clear overview of their storyboard's progress. Furthermore, participants find it valuable that they can easily consult their outcomes from the brainstorm templates for filling in the response template by simply holding these templates next to each other. But having so many templates next to each other was also perceived as a disadvantage since the templates were a lot to take in and therefore overwhelming at times. Especially when explaining the overall process of the episode builder and the steps within the templates. Or when the participants didn't need to use certain templates at different parts of the process.

P5: A digital version of the tool would work better for me for getting to know the tool. [...] Now, you lay everything at once on the table, which is way too much to understand. When the tool is digital, you can explore everything step-by-step. This way, you can better understand the order of steps you should take, and you can highlight different elements which are now overlooked.

To what extent can the laminated templates be reused when creating a new episode around another central theme?

The three groups worked with the same laminated templates at each test. This means the templates were cleaned twice before each test. It took around half an hour to clean the two brainstorm templates, one response template and 4 shot cards on average. Some marks of the previous groups were lightly visible, but the participant in the next group didn't vocally expressed that they have seen these marks.

During the test, the reused templates performed the same as in the previous tests, and didn't show any signs of having water damage from the whiteboard sprays.

5.3 Concept evaluation

In this chapter the episode builder will be evaluated on the two main design principles that the episode builder is trying to achieve:

1. *Designing an episode builder which helps filmmakers to create educational storyboards around a self-selected theme for 1.5-3-year-olds, while meeting the parents' concerns.*
2. *Designing an episode builder which fits can practically be implemented within the creative process of filmmakers*

Design principle one will be evaluated based on how well the groups were able to achieve each of the template's main goal(s) which are stated on pages 68-76. The outputs of each template determine the outcome of the storyboard, which educational value will be evaluated on the "design guidelines for creating an educational storyboard", which are stated on pages 42-43 It is essential to take in mind that suppose participants were able to fill in the templates without making any mistakes, in that case, it does not mean that the outcome of the storyboard will fulfil all the episode's educational guidelines. When all the templates deliver an outcome as they were supposed to, the evaluation on the storyboard's educational value is an indication of how well the current templates are able to achieve these guidelines.

Design principle two will be evaluated based on the results of the remaining research questions of the final test.

A scale is used to indicate if and to what extent the guidelines are addressed by the Episode Builder toolkit (○○○ not achieved at all, to ●●● practically achieved). An overview of how these guidelines are addressed is shown in Figure 46 on page 90 and 91.

The guidelines which are specifically related to the episode builder, and which are not fully met shall be referred to in the recommendations.

5.3.1 Evaluation of design principle 1

All the groups were able to select a central theme and explore its essential features within the brainstorm circle template. Obtaining an overview of which features fit the level of complexity that a 1.5-3-year-old can handle was perceived as the most valuable advantages of the episode builder toolkit by the participants. Especially, since 3 out of 6 participants had stated that they overestimated the abilities of the child, so using the tool works as a "wake-up call". The two groups which chose an animal as a central theme had the idea they have explored the object to its full essence. However, the group that chose a thing as a central theme did not felt they explored the full essence of the object. They only brainstormed on the question "Why you would use this part of the object", and were missing the question "Why would you use this object in it is whole?" within the template. So the brainstorm circle template does not work entirely for each object category yet.

When using the brainstorm square template, the groups were able to create the essence of the story about what the central theme is going to do. All groups were also able to fill in the right features within the auditory part of the response templates.

However, two groups lost educational quality within their storyboards when they were drawing the shots within the response templates. The groups overlooked the visual selection guides, so they overlooked the step of selecting the features from the brainstorm templates. Therefore they drew the shots by using their intuition. However, these shots did not have a clear point of focus or were using several camera angle changes, which cognitively burdens the viewer. Furthermore, none of the groups was able to correctly draw the state changes of the object that undergoes the main action within the story when filling in the brainstorm action square. This will probably negatively affect the drawing of the correct shots within the Helping Hand response template since

this template uses state changes as visual selection guidelines. Therefore, filmmakers should be more supported in visually representing different elements within their shots, so they do not overwhelm the viewer. Especially when they are working with the brainstorm square template and the response templates.

Finally, the stories around the different themes were all quite different, which will keep the viewer interested. However, none of the groups achieved to create a storyboard which is coherent and fits the response moment naturally from the beginning till the end. The participants stated that since they had lost their focus at the end of the test. However, it might also be the case that participants do not get inspired enough by the brainstorm questions to create a coherent storyline when they are actually trying.

5.3.2 Evaluation of design principle 2:

All the groups agreed that it is a good thing that they were held back with their creativity at times since they find it is a necessity of making the story not too complicated for children. However, two participants expressed that they would not spend much time on filling in templates which are structurally entirely fixed, like the response template. Instead of focusing on making these templates more creative, they see more value if these templates become more automized or simplified.

None of the groups did create a 3-5 minute storyboard within the 1,5-hour timespan. Supposedly each shot would take around 4 seconds; their storyboard would have been between the 62 and 90 seconds long. It is predicted that the groups would take between the 2-3.75 hours to create 3-5 minute long storyboard around a self-picked theme (see Appendix D.4), which means that the episode builder can let filmmakers create an educational storyboard under 4 hours. However, this should be observed in a test which is 4 hours long. All of the participants stated that time could be spared by explaining the templates by using a visual example or gaining experience with the templates. All participants agreed that the response template took quite long to fill in due to its repetitive elements.

Finally, the laminated paper templates were cheap and quick to produce and do not require any investment in developing a digital tool. All the laminated templates sustained three tests and were able to get sufficiently cleaned within 30 minutes. Time was especially saved when the response templates and the shot cards did not need to be printed out again, which would have taken around an hour to stick A4's together to create a response template and cutting the shot cards. However, 5 minutes cleaning an A4 brainstorm template probably does not outweigh the benefits of printing out a new one which can be done in one minute.

Design principle 1

Guidelines related to "Designing an episode builder that guides the filmmaker into exploring and selecting essential features around a central theme which fits the level of complexity that a 1.5-3-year old can understand, and translate these features into an educational storyboard, while meeting the parent's needs.. "

Design principle 2

Guidelines related to "Designing an episode builder which can practically be implemented within the creative process of filmmakers"

Design guidelines episode builder

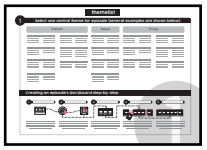
The participants were able to correctly fill in some of the episode builder's templates around a self-picked theme so that they can create an educational storyboard for a 1.5-3-year-old

Suppose participants would have no time limit and were more experienced with the templates. In that case, it is predicted that participants would take between the 2-3.75 hours to create a 3-5 minute long storyboard around a self-picked theme, which is created within 4 hours.

All the groups agreed that it is a good thing that they were held back with their creativity at times since they find it is a necessity of making the story not too complicated for children. However, the selection process within the response template should be more automized

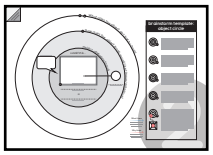
The laminated templates were able to be reused when creating a new episode around another central theme

Are the main goals of the templates reached to create educational value?



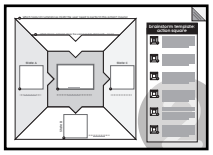
All the participants were able to select a central theme for the storyboard that fits the developmental needs of a 1.5-3-year-old

Although all participants knew in which order the needed to use the templates. Participants were not able to create a clear vision about what outcome is expected for each template and why this outcome is important for the next template when reading the instructions



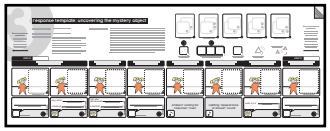
Two groups which have chosen an animal as central theme, were able to create a clear vision about which features are most effective to help the viewer to categorize this animal

One group that have chosen a thing as central theme, were able to create a vision about a lot of that thing's essential features. However the template doesn't focus enough on the core reason why you would use this particular thing in its whole.



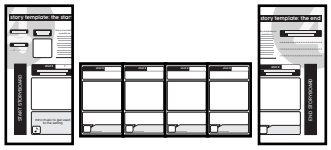
All groups were able to create a clear vision about which features are most effective to help the toddler to categorize a novel action. However all groups made mistakes in drawing the different states of the object which undergoes the action. This affects the way of correctly filling in the response template.

All groups were able to determine the base of the storyboard's storyline, which is the action that the central theme is going to do



All of the groups were able to correctly translate the central theme's essential features into the auditory part of the fixed storyboard format

Only one group was able to translate the central theme's essential features into the visual part of the fixed storyboard format in the correct way. The other two groups took more freedom, which led to a lot of distracting shots.



All the groups were able to complete the storyboard by filling the gaps between the story templates and the response template with the shot cards. However due to time constraint and loss of energy, none of the groups was able to create storyboard which was coherent, interesting and 3-5 minutes long

Legend

- achieved
- not achieved / not completely achieved
- not tested
- not achieved at all
- practically achieved

Figure 46
Overview of validation of the design guidelines and template goals

Design guidelines for creating an educational storyboard

General guidelines

The series should actively teach the child about link words to their representation, how to perform daily situations, counting, colors and/or shapes. Furthermore, a series that improves the child's motor skills is approved by the parents as well

All the created response moments within the storyboards were safe to be performed by the child, without the supervision of the parent

All the created response moments within the storyboards would work together with interactive abilities of a television

Meaningful

Two out of three groups used change of camera angles within the response moments, which cognitively burdens the child.

All participants actively chose the storyboard's setting that matched with the toddler's environment

The dialogue used within the series matched the toddler's vocabolary as mush as possible, since participants keep the amount of involved objects small

The response moments contained some SVO-sentences which were filled-in well, but particpants weren't stimulated to create SVO-sentences in the rest of the story.

The response moment templates use the toddler's word learning strategies to increase the effectivity of the learning proces when introducing novel words. However the groups didn't draw the central theme's features into the shots correctly.

It would be nice if parents are able to link the episode's content to the real world when watching tv is over, to minimize the video deficit

Actively engaging

Since two groups overlooked the visual guidelines of the response moment, there was no clear point of attention for the viewer in several shots.

All the response moments contained participatory cues that would trigger a reaction from the viewer

Thanks to the response template, all the participants have drawn the correct answer within the storyboards, so the viewer can reflect on their answer

All the response moments expected a response that fits child's verbal and motor abilities

None of the created storyboards were between the 3-5 minutes long, but it would have fit the child's attention span

Iterative

Two groups introduced the object on which the toddler need to actively reflect about before the response moment, but in a rushed way

Socially interactive

All the created response moments were be triggered by the main charactre which the child has an emotional bond with

Joyful

All three the storyboards with their own themes were completely different from each other. So variety between episodes is possible

The group that had chosen the helping hand response template was able to create a dance and song about "milking the cow"

6 Conclusion

Introduction

In this chapter, the conclusion of the project results is described. In addition, limitations regarding research and design are discussed. Recommendations for future work are described followed. Finally, a personal reflection on the project approach and personal goals.

6.1 Conclusion

For this thesis, the aim was to design an 'Episode Builder' which would help filmmakers to easily create a wide variety of episodes that all contain at least one educational response moment for toddlers (1.5-3-years-old) while meeting parents' concerns. Additionally, four different response moments were designed, which would trigger the child to actively reflect on the presented content about the central theme to increase the episode's educational value. Eventually, these response moments were integrated within the concept of the episode builder toolkit.

During the analysis phase, the "Learning through play" framework was to evaluate the educational value of watching television for 1.5-3-year-olds. According to this framework, the educational value of a storyboard can be assessed by six core elements from which four should always be present, which are that the presented content should have 1) a clear learning goal, and should be 2) joyful, 3) meaningful and 4) actively engaging. The educational value of the presented content can be increased if the content is also 5) iterative and 6) socially interactive. Extensive literature studies and an interview with a pedagogue resulted in an overview of context-dependent design opportunities and threats that would affect the educational value of watching television, spread over the six core elements of the framework.

A context mapping research focussed how and when Dutch parents let their toddlers watch television at home. Four different situations and their desired effects were identified when parents let their toddler watch television. The most common situation and therefore chosen for up following design iterations, was the case in which the parent puts their child behind TV because the parent needs to do something which requires their full attention during the day. Parents were bothered that their child wasn't actively thinking about the presented content on television, so watching TV is perceived as lost time in which the child could have actively explored something about the real world. For the chosen context, a design goal, an interaction vision and 18 design guidelines for creating educational episodes were formulated, which resulted in the design of four different educational response moments in storyboard format. The four response moments are divided into three types of responses, namely one pointing response, two different types of one-word responses (addressing an object or yes-or-no) and one fine motor response. All three the response types took into account that the triggered response was safe to be performed by the child without the supervision of a parent.

Furthermore, the Pixifox Animation's first storyboards were evaluated by the 18 design guidelines, which gave the main insight that filmmakers integrated too many features within their storyboards which are too complicated for the viewer. Two main design principles were formulated that the episode builder's design must fulfil. Firstly, the episode builder is supposed to help filmmakers to explore features around a central theme, which are essential for a 1.5-3-year-old to learn about a novel theme, and integrate these features within their storyboard

while meeting the parents' concerns. Furthermore, the episode builder is supposed to fit the filmmaker's creative process. Four episode builder guidelines were formulated, which together with the design of the four response moments, influenced the Episode Builder's final concept, which consisted of five different templates which should be used in subsequent order.

A validation study with 6 participants was set-up to test the Episode Builder. In pairs of two, the participants worked with the five laminated paper templates to create an educational storyboard which would contain one response moment in a corona proof test setting. The main focus of this test was to clarify whether the Episode Builder is able to facilitate filmmakers to create a great variety of educational storyboards around different central themes, which all include at least one response moment. Additionally, the extent the Episode Builder would fit within a filmmakers creative process was tested as well.

The Episode Builder found to be able to facilitate filmmakers to create various educational storyboards which all include one response moment around different central themes. All the groups were able to explore the essential central theme's essential features and select them within their storyboards. Therefore, participants had a clear idea about what the essence of the story and the learning goal should be within the storyboard, which would fit the level of a 1.5-3-year-old. However, some educational value was lost, since the Episode Builder failed to facilitate the participants to translate these features into visual shots which aren't overwhelming for the viewer. Also, participants weren't able to create a coherent storyboard of 3-5 minutes due to time restraints and the template's learning curve. The activity of creating storyboards with the help of the Episode Builder was reviewed by the participants insightful, a lot to take in but then probably easy to use, and somewhat repetitive.

6.2 Discussion & recommendations

6.2.1 Discussion and recommendations about the process in general

Ideating for innovative television:

- The focus within this project was not so much on designing an innovative response moment for 1.5-3-year-olds, so there is still a lot to explore. From the literature research, it became clear how many different elements (ex. sound, motion, character design etc.) should come together in a video to be able to trigger a response from a 1.5-3-year-old. Neither, Pixifox or I was able to create to set up a test with a high-quality video containing an innovative response moment within this project's time frame. So the focus shifted more towards ensuring that filmmakers can create educational value in every storyboard that they would make. Within this project, I designed four different response moments so they can be used as a template within the Episode Builder. However, they are not the most innovative response moments. Suppose if an animation team has a developed a base for a series already which has been proven to be successful, more time could be spent on creating more innovative response moments which can also be tested.
- Another interesting direction for creating innovative television for 1.5-3-year-olds is how television can provide value in the other explored situations when toddlers are watching tv from the context mapping research. These situations provide design opportunities which might provide other values then stimulating development, like stimulating parent-child or sibling relationships. For example, the situation in which the toddler is sitting on the couch with their mother and younger sibling. This opens a design space where an innovative tv series can play a leading role in creating a cosy family moment between mother and children—or teaching the toddler about how to be a great brother or sister to his or her younger sibling. More design opportunities for the situations when parents let their child watch television can be found on pages 28-29.

Testing:

- At the beginning of this project, it was the intent that the Pixifox animation team was going to test the episode builder toolkit 3-5 times to see if they can create various episodes around different themes. However, due to the corona crisis, this was not possible anymore. So Industrial Design students had to spare their time to do a 2,5-hour test for testing a toolkit which was not directly in their interest. The 1,5-hour time span of actually testing the episode builder was already a short time for letting the participants explore the central theme's essential features and letting them create a 3-5 minutes long storyboard. Moreover, the participants had to spend extra time in understanding how to use the templates and what output is expected from them. This way, the participants spent only the last 10-15 minutes to create a complete, fun and coherent storyboard by using the story templates and the shot cards. This was supposed to be the most fun and creative part of the process. However, none of the participants had energy left after spending this much time on understanding the templates, so the storyboards were rushed. Therefore, the current final test doesn't give a full insight into how fast participants can actually work with the templates and how much creativity they can express at the end of the process and therefore the process overall.

  For future recommendation, it is important that the episode builder will be tested with participants who are interested in testing the episode builder multiple times, spread over 3 to 5 sessions which each take 4 hours. The first session will be focussed on getting to know the tool. The next 2 to 4 sessions will be focussed on creating educational, fun, and complete storyboards which are 3-5 minutes long.

6.2.2 Recommendations episode builder

Some of the storyboards' educational quality was lost because participants didn't translate the theme's essential features into visual shots of the response moment in the correct way. This was because they overlooked the visual guides on the response template because there were too many elements to look at, and there was no clear order on how different parts should be filled in. In general, participants stated that the episode builder was a lot to take in for the first time. Therefore the introduction to the episode builder should be designed in a better way. Therefore, the following possible solutions are recommended:

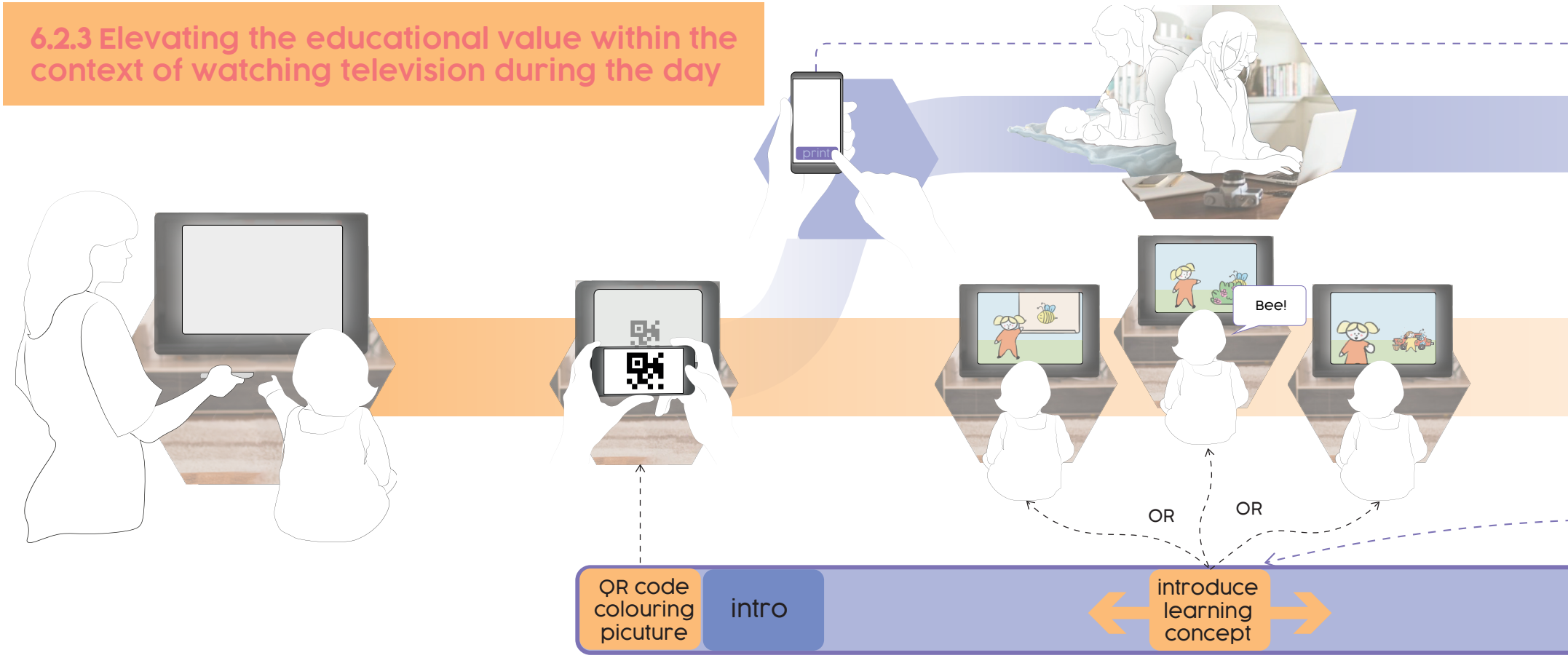
- Guide the filmmakers more on how the templates should be used when filling in the templates for the first time in a workshop format, so they need to rely less on their intuition.
- Create clear visual guidance on the response templates in which order different elements should be filled-in.
- Overwhelming elements like the instructions on the sides of the templates can probably be removed from the templates, so the filmmaker is better able to focus on more important features to fill in the template. However, the participants stated that they did like the instructions to be presented in another format, like a booklet or a digital presentation.

Furthermore, the brainstorm circle template seems to work fine for creating a clear vision about the essential features when the central theme is an animal. However, the one group which chose a thing as the central theme had difficulties writing down why somebody would use the thing its whole, and not only why some part would be used within a situation. It might be necessary that a separate brainstorming template needs to be designed, which suits the exploration of the essential features for things in a better way. This could also be the case for central theme's which are people, places and time.

Finally, the participants found that they had to do a lot of repetitive work when filling in the response template, while they were not able to express their creativity. The response template needs to be quite strict in filling the essential features within the storyboard, so the viewer's attention is guided to the correct places on the screen. Therefore future design explorations need to focus on how the response template can be filled in more efficiently, without losing the educational quality of the storyboard. The following design spaces could solve this problem:

- Using a digital tool which automatically would fill in the changeable parts the storyboard within the response template when the filmmaker selects essential features from the brainstorm templates. For example, if the filmmaker would draw how the changeable part of the visual shot should look like in the copy-and-paste drawing box, then the corresponding drawing boxes within the storyboard would be filled in as well. This way, the filmmaker only needs to draw 2-5 visual elements instead of drawing the same elements repeatedly within the storyboard. This system could also apply for filling in the blanks within the textboxes. The challenge in realizing this idea is how such digital tools can be implemented in the work process of filmmakers in a cheap and practical way. How can the process of the episode builder be designed in such a way that it incorporates the advantages from both the paper- and the digital tool?
- Reduce the amount of drawing and textboxes that need to be filled-in by the filmmaker, without losing the educational quality. It could be that visual shots don't need to be draw in such detail within a storyboard to transform the content into video format. However, there should be more research done of how detailed the storyboards in the professional fields are made.

6.2.3 Elevating the educational value within the context of watching television during the day



One of the main challenges that the design of the storyboard didn't overcome is tackling the video deficit. This means that toddlers aren't always able to link objects which are presented on television to actual objects in the real world. Researchers found that this effect can be emolliated if parents are watching television with the toddler together, and actively help the toddler link the presented content to the real world. Like when a cat is presented on television, then the parent will show their child what a cat looks like in the real world by pointing towards the cat outside. However, parents are not present in the current context.

Therefore it would be nice if an activity is designed that stimulates parents to reflect with their toddler on the episode's content later that day. Not only will the toddler be able to link the content to the real world, but the toddler will also repeat the content, which results in better memorization.

An example of such activity would be a that each episode has its own colouring page which highlights the learning objectives around the central theme. The colouring page can be accessed by scanning a QR code which is shown at the beginning of each episode, just before the parent is going to do his own thing. The colouring page is then sent to the phone and can be printed on the home printer. When the activity of watching television is over, the parent can let their toddler fill in the colouring page. Key points are introduced on the side of the colouring page, to inform the parent what the child has learned about the central theme when watching the episode. Also, questions are introduced, which the parent can ask to the child to help him link the content to the real world (see Figure 47).

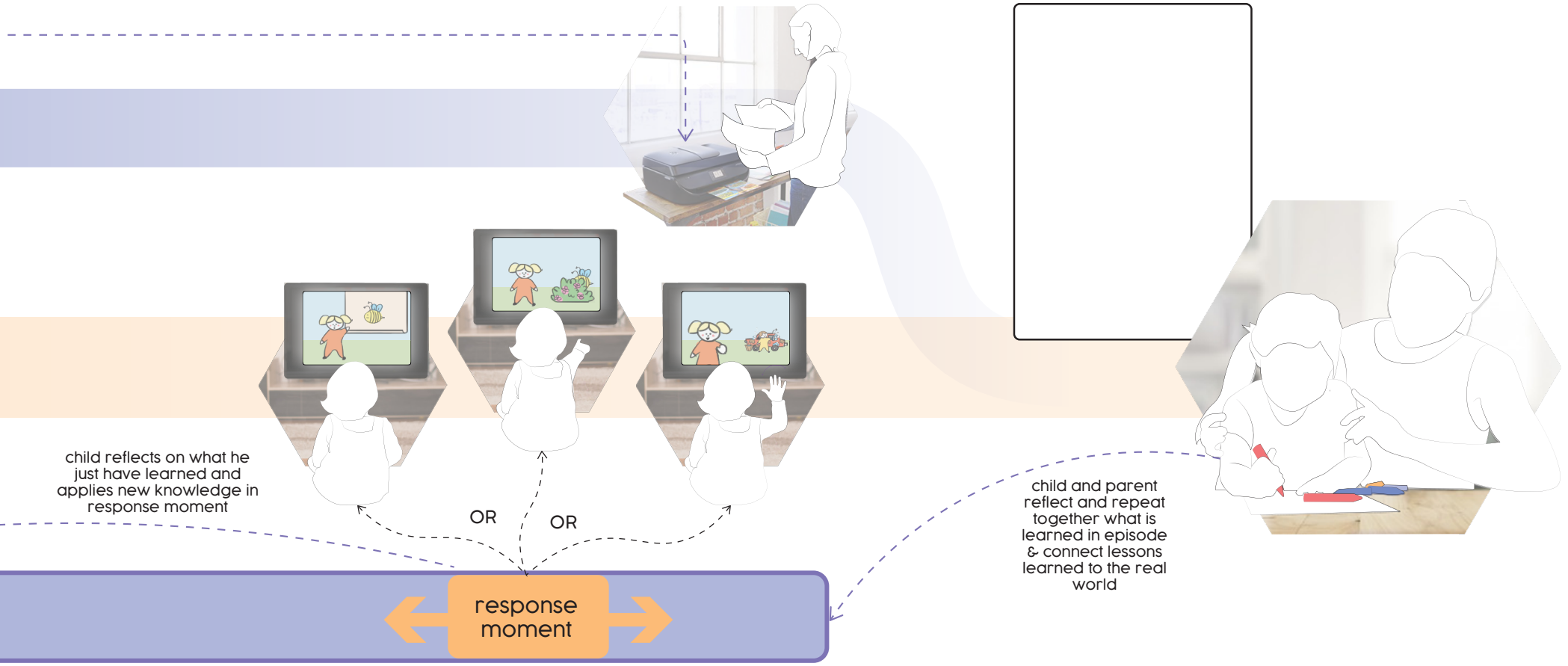


Figure 47
User experience of the colouring page

6.3 My personal reflection on the project

In this section, I reflect on my personal goals which I formulated at the begin of the project. In addition, I describe some personal learnings that I had throughout the process.

Creating a tool which is feasible to produce

At the beginning of the project, I wanted to create something that Pixifox Animation would be able to implement within their process quickly, so the design could directly be useful. Although Pixifox Animation is not involved in the project anymore, I am happy that I designed the episode builder in a way that it can practically be used by anybody and is lowcost to produce. Within my project, I also made a conscious decision about whether the tool should be digital or in paper form. Since developing a digital tool would also mean that there are developing costs, and it would also take more time to be able to use the tool. By laminating the paper templates, the tool becomes even more practical, since it can be reused when people want to create a new episode. By cleaning the templates, they don't need to spend time on cutting the shot cards and sticking the response templates together.

Creating a rich understanding of the parents, the children and their context via online tools

As a designer I like to create a deep understanding about the project's context, and discover the why's and how's of people when they are doing things. So I like to practice this skill as much as possible.

However, one of the consequences of the coronavirus was that everything had to be done online. This way, I had transform designer method's, which I generally would have done physically, to online formats, under which the context mapping session with parents. At first, I was afraid that I wouldn't get a deep understanding of how toddlers are watching television, since I wouldn't get to observe them in real life. However I tried to make the best out of the situation, by giving the parents the assignment to film their toddler whenever they used screen media within the week before the interview, I obtained quite some materials. Another unexpected outcome of this assignment was that parents were willing to share photos and videos of their child when they were using screen media at different ages, so I could get an insight how the toddler reaction changes over the months.

Giving the parents a cultural probes booklet containing daily assignments helped to guide the conversation to more hidden reasons when doing the online interviews. I designed the cultural probe booklet in such way already that it already contained some answers that I wanted to know. By letting the parents share their photos of their filled-in booklet, we were both able to talk about the deeper reason why they have written down a certain element.

Overall, I am quite happy about how quickly I was able to adjust myself to create a context mapping session after al. And I was quite surprised by the richness of the outcomes that an online interview with a cultural probe booklet has to offer.

Improving my writing skills

At the beginning of the project, I knew that my writing skills were a bit sloppy since writing is my least favourite part of the design process yet so important. Within this project, I tried to practice with clear and easy-to-read sentences. By using the program Grammarly, I was able to check my texts on mistakes and how well these texts were written by looking at the performance score. I made writing more fun for myself by trying to increase this performance score by iterating on my sentences. Although I am not a writing expert yet, I notice a considerable improvement in my writing skills. And I noticed that I find it easier to write clear texts.

Personal learnings

During this project, I had a lot of ideas about what kind of activities I could do every week. At the same time, I also had the feeling that I had to live up to do all these activities and needed to create something new every week. Otherwise, I had the idea that I wouldn't make enough progress. However, I didn't realize that documenting your activities and writing conclusions is also progress until I was about to hand in my greenlight report. I realized that it is okay to take some to document the outcome of your process first before you start something new again. I noticed that it was better to have a clear overview of what I was doing once I finalized the outcomes of my activities within my report.

Furthermore, starting something new without documenting your previous activities will only create more work for yourself in the future without even realizing it, since you still have a lot to catch up on documenting. This is one of the reasons why I sometimes struggle with my planning when encountering my deadlines. So the lesson I take from this is that I should allow myself more to give myself more time to finish something and report. This way, I am probably better able to reflect on the outcomes of activities and what these mean for my project. And therefore instead would go for quality over quantity.

Bibliography

1. Anderson, D.R., & Lorch, E. (1987). Looking at television: Action or reaction? In J. Bryant & D. R. Anderson (Eds.), Children's understanding of television: Reearch on attention and comprehension. NY: Academic Press.
2. Anderson, Daniel R., & Hanson, K. G. (2010). From blooming, buzzing confusion to media literacy: The early development of television viewing. Developmental Review, 30(2), 239–255. https://doi.org/10.1016/j.dr.2010.03.004
3. Anderson, Daniel R, Bryant, J., Wilder, A., Santomero, A., Williams, M., & Crawley, A. M. (2000). Researching Blue's Clues: Viewing Behavior and Impact. Media Psychology, 2(2), 179–194. https://doi.org/10.1207/S1532785XMEP0202_4
4. Barr, R., Muentener, P., & Garcia, A. (2007). Age-related changes in deferred imitation from television by 6- to 18-month-olds. Developmental Science, 10(6), 910–921. https://doi.org/10.1111/j.1467-7687.2007.00641.x
5. Bonawitz, E., Shafto, P., Gweon, H., Goodman, N. D., Spelke, E., & Schulz, L. (2011). The double-edged sword of pedagogy: Instruction limits spontaneous exploration and discovery. Cognition, 120, 322–330.
6. Calvert, S. L., Strong, B. L., Jacobs, E. L., & Conger, E. E. (2007). Interaction and Participation for Young Hispanic and Caucasian Girls' and Boys' Learning of Media Content. Media Psychology, 9(2), 431–445. https://doi.org/10.1080/15213260701291379
7. Courage, M. L., & Howe, M. L. (2010). To watch or not to watch: Infants and toddlers in a brave new electronic world. Developmental Review, 30(2), 101–115. https://doi.org/10.1016/j.dr.2010.03.002
8. Factsheet mediagebruik 0- tot en met 2-jarigen. (2015). In Toolbox Mediaopvoeding. www.nji.nl/toolboxmediaopvoeding
9. Fisch, S. M. (2004). Children's Learning From Educational Television. Taylor & Francis Inc.
10. Fisch, S. M., & McCann, S. (1993). Making broadcast television participative: Eliciting mathematical behavior throughSquare One TVNo Title. Educational Technology Research and Development, 41, 103–109.
11. Flavell, J. H., Flavell, E. R., Green, F. L., & Korfmacher, J. E. (1990). Do young children think of television images as pictures or real objects? Journal of Broadcasting & Electronic Media, 34(4), 399–419.
12. Hirsh-Pasek, K., Zosh, J. M., Golinkoff, R. M., Gray, J. H., Robb, M. B., & Kaufman, J. (2015). Putting Education in "Educational" Apps. Psychological Science in the Public Interest, 16(1), 3–34. https://doi.org/10.1177/1529100615569721
13. Huston, A. C., & Wright, J. C. (1983). Children's understanding of television: Research on attention and comprehension (J. Bryant & D. R. Anderson (Eds.)). NY: Academic Press.
14. Huston, A. C., Wright, J. C., Wartella, E., Rice, M. L., Watkins, B., Campbell, T., & Potts, R. (1981). Communicating more than content: Formal features of children's television programs. Journal of Communication, 31, 32–48.
15. Linebarger, D. L., & Vaala, S. E. (2010). Screen media and language development in infants and toddlers: An ecological perspective. In Developmental Review (Vol. 30, Issue 2, pp. 176–202). https://doi.org/10.1016/j.dr.2010.03.006
16. Matte-Gagné, C., Berier, A., & Lalonde, G. (2015). Stability in maternal autonomy support and child executive functioning. Journal of Child and Family Studies, 24(9), 2610–2619.
17. Meij, H., & Ince, D. (2013). De ontwikkeling van kinderen.
18. P. Nikken. (2019). Iene Miene Media: Een review van het mediagebruik van kinderen tussen de 0 en 6 jaar in Nederland sinds 2012.

19. Pierroutsakos, S. L., & Troseth, G. L. (2003). Video verite: Infants' manual investigation of objects on video. Infant Behaviour and Development, 26(2), 183–199.

20. Piotrowski, J. T. (2014). Participatory Cues and Program Familiarity Predict Young Children's Learning From Educational Television. Media Psychology, 17(3), 311–331. https://doi.org/10.1080/15213269.2014.932288

21. representational skills – APA Dictionary of Psychology. (n.d.). Retrieved April 14, 2020, from https://dictionary.apa.org/representational-skills

22. Satherley, D. (2017). Elsagate: The disturbing YouTube trend that might be terrifying your children. https://www.newshub.co.nz/home/entertainment/2017/11/elsagate-the-disturbing-youtube-trend-that-might-be-terrifying-your-children.html

23. Strommen, E. (2000). Interactive toy characters as interfaces for children. In E. Bergman (Ed.), Information appliances and beyond: Interactive design for consumer products (p. 385). Morgan Kaufmann Publishers.

24. Troseth, G. L., Saylor, M., & Archer, A. (2006). Young children's use of video as a source of socially relevant information. Child Development, 77, 786–799.

25. Valkenburg, P. M., & Piotrowski, J. T. (2017). Media and Education. In Plugged in. How Media Attract and Affect Youth (pp. 175–194). Amsterdam University Press.

26. Valkenburg, P. M., & Vroone, M. (2004). Developmental changes in infants' and toddlers' attention to television entertainment. Communication Research, 31(3), 288–311. https://doi.org/10.1177/0093650204263435

27. Wright, J. C., & Huston, A. C. (1983). A matter of form: Potentials of television for young viewers. American Psychologist, 38, 835–843.

28. Zosh, J. M., Brinster, M., & Halberda, J. (2013). Optimal Contrast: Competition Between Two Referents Improves Word Learning. Applied Developmental Science, 17(1), 20–28. https://doi.org/10.1080/10888691.2013.748420

29. Zosh, J. M., Emily J. Hopkins, Jensen, H., Liu, C., Neale, D., Hirsh-Pasek, K., Solis, S. L., & Whitebread, D. (2017). Learning through play : a review of the evidence (white paper). https://doi.org/10.13140/RG.2.2.16823.01447

Appendix

A.1 Flyer for recruiting families for the context mapping sesion

Kan jij mij helpen?

Ik ben op zoek naar **interview deelnemers** die input kunnen geven over het **media- en speelgedrag van 1,5 t/m 3 jarigen in het huidige gezinsleven**

Wie zoek ik?
Een ouder of verzorger met zijn of haar kleintje (1,5 t/m 3 jaar)

Waar wordt de sessie gehouden?
Ik kom bij jullie thuis langs!

Wanneer?
Wanneer jullie het beste uitkomt. Belangrijk is dat het kleintje wel wakker is, zodat ik het speel- en televisiegedrag van het kleintje kan observeren. De sessies worden tussen 24 maart en 12 april gehouden.

Is er voorbereiding?
Ja, een week van tevoren zal ik een opdrachtenboekje opsturen die je als ouder of verzorger moet invullen. Dit boekje bevat leuke opdrachten die je alvast dieper laat nadenken over de onderwerpen die in het interview aan bod zullen komen. In totaal zijn er 5-6 opdrachten die elk tussen de 10-20 minuten zijn te beantwoorden.

Wat hebben jullie eraan?
Jij en je kleintje dragen bij aan het onderzoek over hoe we televisieseries voor 1,5 t/m 3 jarigen nog leerzamer en leuker kunnen maken. Daarnaast krijgen jullie ook een gezinsticket voor een gezellig dagje uit in het nijntje museum in Utrecht!

TU Delft Delft University of Technology pixifox animation Play Well Lab

Hoi, ik ben Tjitske en ik studeer aan de TU Delft. Ik doe momenteel mijn afstudeeronderzoek naar hoe televisieseries voor 1,5 t/m 3 jarigen nog leerzamer kunnen worden en hoe spel daarbij een rol kan spelen. Ik heb daarvoor inzichten nodig van ouders of verzorgers met jonge kinderen.

Ik ben daarom op zoek naar ouders die ik kan interviewen over hun gezinsleven, ouderschap en hoe er wordt omgegaan met media en spel binnen het gezin. Daarnaast wil ik ook kort het speel- en televisiegedrag van het kleintje observeren. Deze input zal heel waardevol zijn voor mijn onderzoek! De sessie zal ongeveer 1,5-2 uur duren.

Alle opgedane informatie zal binnen de betrokken partijen blijven en dus niet openbaar worden gemaakt.

Wil je meedoen/ heb je vragen/ ken je iemand? Voel je vrij om mij te contacten via:

e-mail: t.e.franx@student.tudelft.nl

telefoon: 06-13591990

Als bedankje,
een gezinsticket voor het nijntje musem!
(max 2 volwassen en max 2 kinderen)

A.2 Cultural probe booklet & materials

Dit opdrachtenboekje is
van de familie

(tekening van de familie hier)

DAG 1 - Even voorstellen...

foto of tekening
van
mij hier!

Hallo! Mijn naam is

(naam kleintje)

Ik ben .... maanden oud.

Wat leuk dat je naar
mijn vriendenboekje
komt kijken.

Dit ben ik!

mijn ouders heten: .....

mijn broers en zussen zijn (naam + leeftijd): .....

mijn huisdier is een: .....

mijn hobby's zijn: .....

mijn lievelingsdier is: .....

mijn lievelingskleur is: .....

mijn beste vriend(in) is: .....

mijn lievelingsspeelgoed is: .....

mijn lievelingsspel is: .....

mijn lievelingsmuziek is: .....

mijn lievelingstelevisieprogramma is: .....

mijn lievelingsapp is: .....

ik ben trots op: .....

ik kan heel goed: .....

ik krijg de slappe lach van: .....

ik ben het blijst als ik: .....

ik vind dit nog moeilijk om te doen: .....

ik vind deze dingen stom: .....

ik vind deze dingen eng: .....

DAG 2 - Even voorstellen... (ouder)

Hallo! Mijn naam is

(naam ouder)

En dit is mijn muzieksmaak
en mening over kinderseries

sidenote: wanneer jij je niet kan vinden in bepaalde vragen, bijvoorbeeld jij vind kinderseries of films voor 1,5 t/m 3-jarigen niet leuk om te kijken, dan hoef je niks bij deze vraag in te vullen

(kinder)muziek die
ik leuk vind om te
luisteren

(kinder)muziek die
ik verschrikkelijk
vind om te
luisteren

---

kinderseries+films
voor 1,5 t/m 3
jarigen die ik leuk
vind

---

kinderseries+films
voor 1,5 t/m 3
jarigen die mijn
kind leuk vind

---

kinderseries+films
voor 1,5 t/m 3
jarigen die ik
(enigzins) leerzaam
vind voor mijn kind

---

kinderseries+films
voor 1,5 t/m 3
jarigen die ik
irritant/troep vind

DAG 3 - Een dag in het leven van...

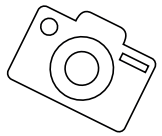
1. Zet alle activiteiten die je op een normale woensdag zou doen op de tijdlijn
2. In een andere kleur, zet alle activiteiten/gebeurtenissen van je kleintje die hij/zij op deze normale woensdag zou doen op de tijdlijn. Zet ook vooral de activiteiten wanneer jouw kleintje schermmedia gebruikt (televisie, telefoon, iPad etc.)
3. Op deze pagina zit een pakketje met stickers bijgevoegd. Plak de vierkante rode stickers bij de momenten die jij als ouder vervelend vind. Plak de vierkante groene stickers bij de momenten die jij als ouders leuk vind.
4. Plak de ronde rode stickers bij de momenten die jouw kind vervelend vind. Plak de ronde groene stickers bij de momenten die jouw kind leuk vind.

START

DAG 4 - Picture day! (optioneel)

Doordat de observeersessie van het speel- en mediagedrag van jullie kleintje komt te vervallen, heb ik deze plaatsvervangende opdracht in elkaar gezet. Op deze dag probeer je zoveel mogelijk foto's/video's te verzamelen van de onderstaande topics. Aan het einde van deze dag kun je foto's en video's via mail of whatsapp naar mij opsturen. De foto's en video's zullen binnen de betrokken partijen blijven (TU Delft en Pixifox Animation) en de gezichten zullen onherkenbaar worden gemaakt.

Deze opdracht is optioneel. Als jij het niet prettig vind om foto's van jouw kleintje of thuisomgeving te delen, dan kan je deze opdracht in zijn geheel of delen ervan overslaan.



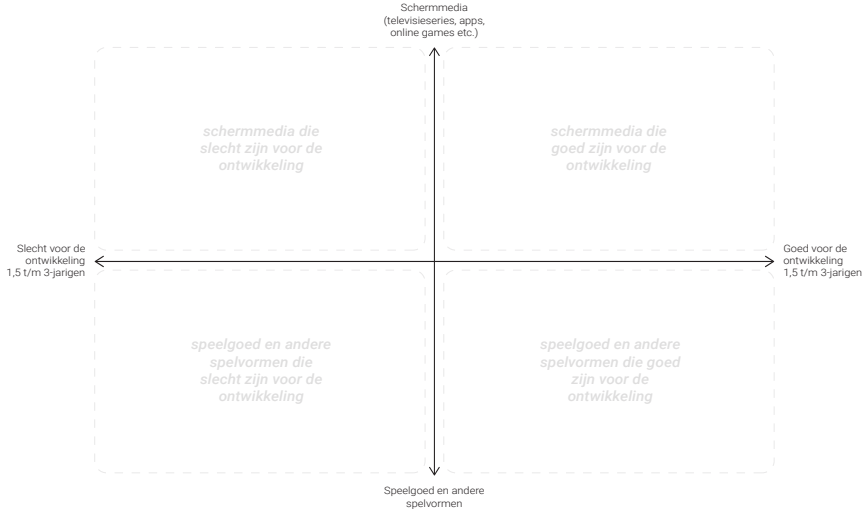
- [ ] Foto's/video's wanneer jouw kleintje aan het spelen is
- [ ] Foto's/video's wanneer jouw kleintje achter schermmedia zit (televisie, telefoon, iPad etc.), vooral de momenten wanneer er een interactief moment plaatsvindt, bijv. er wordt een vraag gesteld op televisie, of je kleintje danst mee met de karakters op televisie etc.
- [ ] overzichtsfoto/foto's van het speelgoed van jouw kleintje
- [ ] foto's van de plekken in huis waar je kleintje vaak speelt

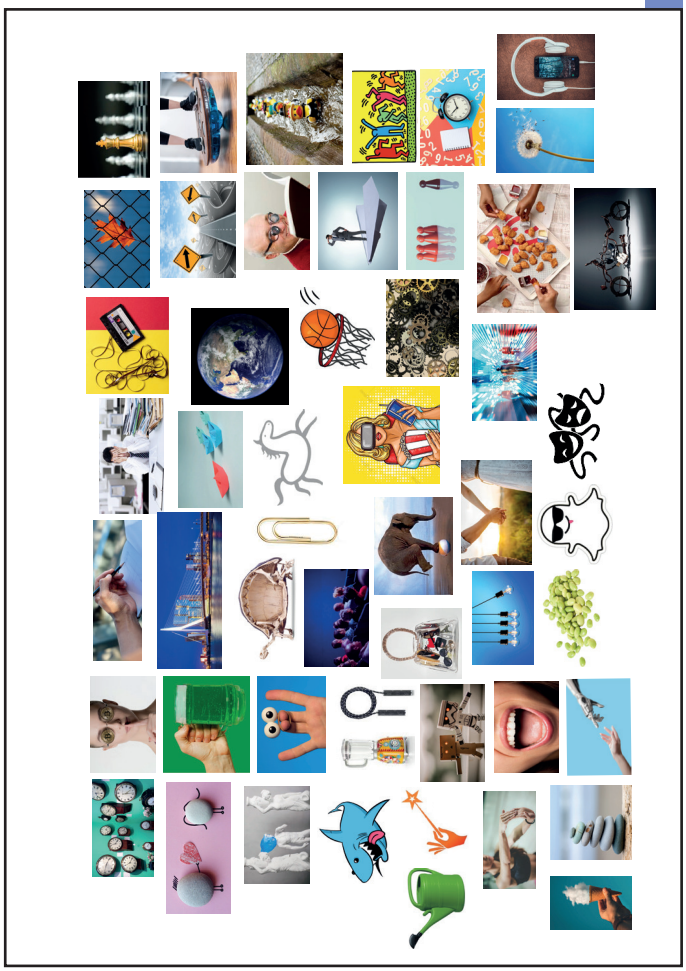
DAg 5- Hoe ik mijn kind later wil zien opgroeien... (collage)

Op deze pagina maak jij een collage over hoe jij graag wilt hoe jouw kind later als persoon zal opgroeien. Denk aan dingen zoals wat voor persoonlijkheid zal jouw kind hebben, wat voor normen en waarden hij/zij heeft of welke dingen jouw kind later heel goed in zal zijn etc.. Bij deze opdracht kun jij de plaatjes van de bijgevoegde plaatjesvellen uitknippen en hier opplakken. De plaatjes die jij kiest hoeven niet 100% overeen te komen met hetgeen wat je in hoofd hebt. Een element uit een plaatje die jou helpt om het verhaal te kunnen vertellen, is dat al voldoende. Mocht het nodig zijn, kan jij ook zelf wat dingen erbij tekenen of plaatjes gebruiken die je in tijdschrift hebt gevonden of iets dergelijks. De collage hoeft niet een kunstwerk te zijn! Het belangrijkst is dat jij aan de hand van deze collage jouw visie aan mij kan vertellen tijdens het interview.

Dag 6 - Spelen en leren matrix

Hieronder zie je een matrix met daarin vier categorieën. Plak in elke categorie minimaal 5 plaatjes van de plaatjessheets waarvan jij denkt dat deze in die categorie past. Dit kunnen kwaliteiten zijn waarvan jij vind dat die speelgoed of schermmedia leerzaam maken of niet. Of de gekozen plaatjes doen je denken aan een bepaald voorbeeld van speelgoed of een bepaalde situatie die rondom het spelen met dit speelgoed voordoet etc.. Opnieuw, de gekozen plaatjes hoeven niet 100% overeen te komen met hetgeen wat jij in jouw hoofd hebt. Zolang jij via de gekozen plaatjes kan uitleggen waarom jij vindt dat bepaalde soorten speelgoed en schermmedia goed zijn voor de ontwikkeling en welke juist niet, dan is dat al voldoende.





Hallo Christine,

en wat fijn dat je mee wilt helpen met mijn onderzoek! Zoals je waarschijnlijk al weet doe ik mijn afstuderen over hoe wij televisieseries voor 1,5 t/m 3 jarigen leerzamer kunnen maken en hoe spel daarbij een rol kan spelen. Momenteel ben ik op zoek naar meer inzichten hoe 1,5 t/m 3-jarigen in hun thuissituatie spelen en hoe zij omgaan met verschillende soorten media (televisie, telefoon, iPad etc.). Maar ook de mening van de ouders over het mediagebruik van hun kinderen is voor dit onderzoek net zo belangrijk. Deze onderwerpen zullen allemaal besproken worden in het interview die we binnenkort gepland hebben. In deze envelop zitten alle materialen die nodig zijn om jou goed voor te bereiden dit interview. Deze envelop bevat onder andere:

- **1 opdrachtenboekje**: In dit boekje staan zes opdrachten verdeeld over zes dagen. Door het doen van deze opdrachten, kun je jouw gedachtes en meningen voorbereiden op de onderwerpen die in het interview aan bod zullen komen. Daarom is het belangrijk dat je dit boekje zo goed mogelijk probeert in te vullen. Ik raad je aan om de opdrachten zo veel mogelijk verspreid uit te voeren over de komende week. Op deze manier zul je ook de kleinere dingen die met dit onderwerp te maken hebben sneller opmerken. Dit zijn vaak dingen waaraan je niet zo snel zou denken in een standaard interview. Slechts één van de ouders hoeft dit boekje in te vullen, maar het is ook oké als jullie dit samen willen doen. Opdrachten van dag 1 t/m 4 zullen maximaal 10 minuten duren om deze te volbrengen. Opdrachten van dag 5 en 6 vereisen wat meer knip en plakwerk en zullen daardoor iets langer duren, maar zullen rondom de 20 minuten te volbrengen zijn.
  Er zijn geen foute manieren om dit opdrachtenboekje in te vullen en de antwoorden zijn geheel persoonlijk. Uiteindelijk ben jij expert op je eigen ervaring en ken jij jouw kind het best! Je hoeft geen dingen in te vullen waarbij jij je niet prettig bij voelt. Dus mocht dit voorkomen, dan kun je delen van de opdracht open laten of de opdracht in zijn geheel overslaan. Stuur een dag van tevoren foto's van de pagina's van jouw boekje naar mij op, zodat ik deze in meer detail kan bekijken tijdens de Skypesessie.
- **3 plaatjesvellen voor dag 5 en 6:** Deze vellen bevatten een set van random afbeeldingen. Verdere instructie hoe je deze vellen precies moet gebruiken zijn te vinden bij dag 5 en 6.
- **1 bon voor een gezinsticket voor het nijntje museum:** Als bedankje voor het meedoen van mijn onderzoek krijgt een tegoedbon voor een dagje uit in het nijntje museum. Dit is overigens niet een officiële tegoedbon van het nijntje museum! De tickets worden geregeld via mij, omdat de bezoeken aan het nijntje museum gepland moeten worden en de betaling daarvan via mij gaat. Volg de instructies op de tegoedbon om deze tickets te bemachtigen. Wil je het liever op een andere manier regelen, kun jij mij daarover contacten.

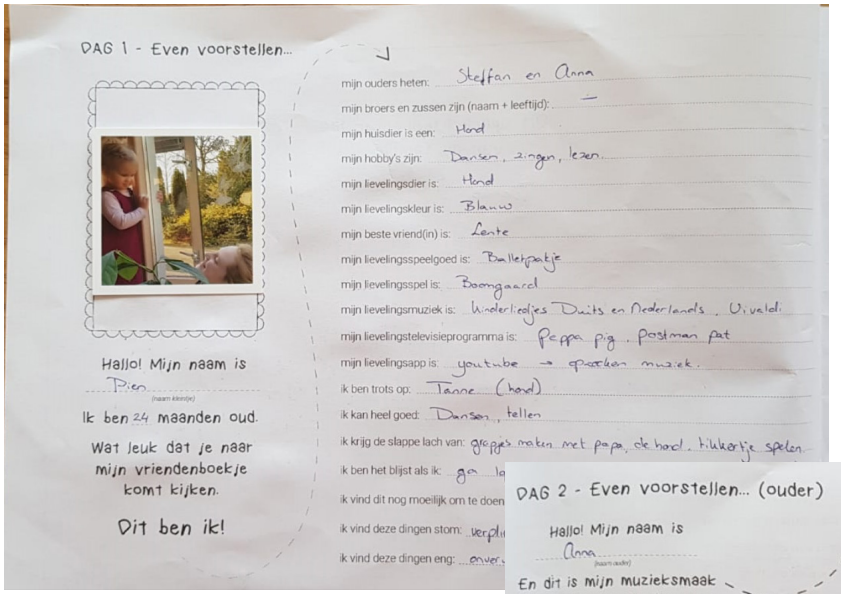
Mochten er nog vragen zijn, stel ze gerust! Je kan mij altijd even bellen/whatsappen via dit nummer: 06-13591990, of mail naar t.e.franx@student.tudelft.nl.

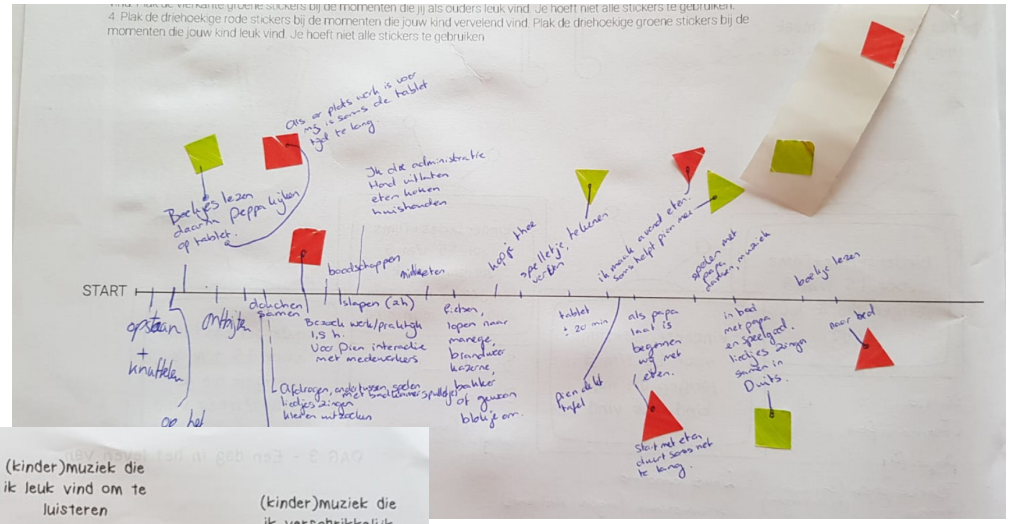
Voor de rest wil ik jou nog heel veel plezier wensen met het doen van de opdrachten, en dan zullen we elkaar zien tijdens de (Skype)sessie!

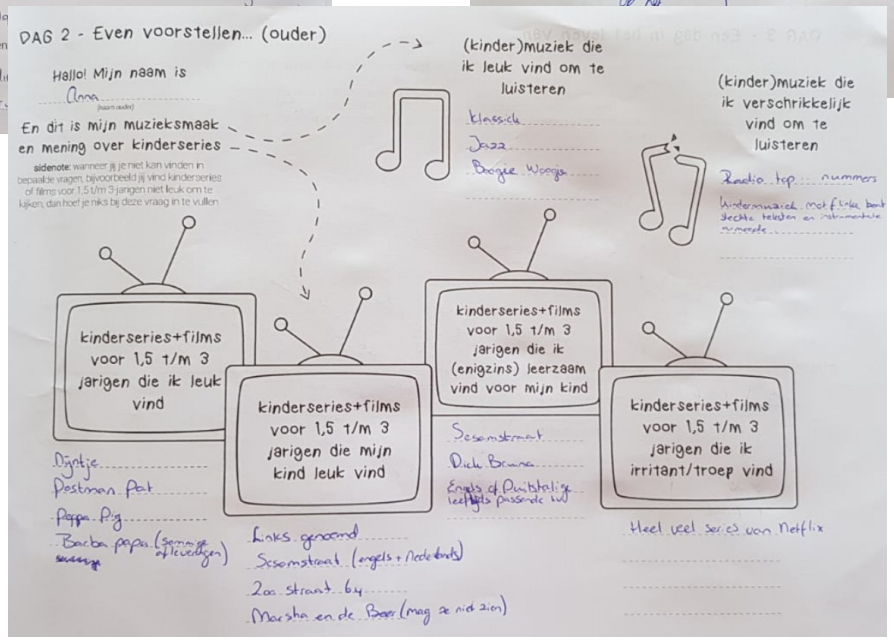
Groetjes,

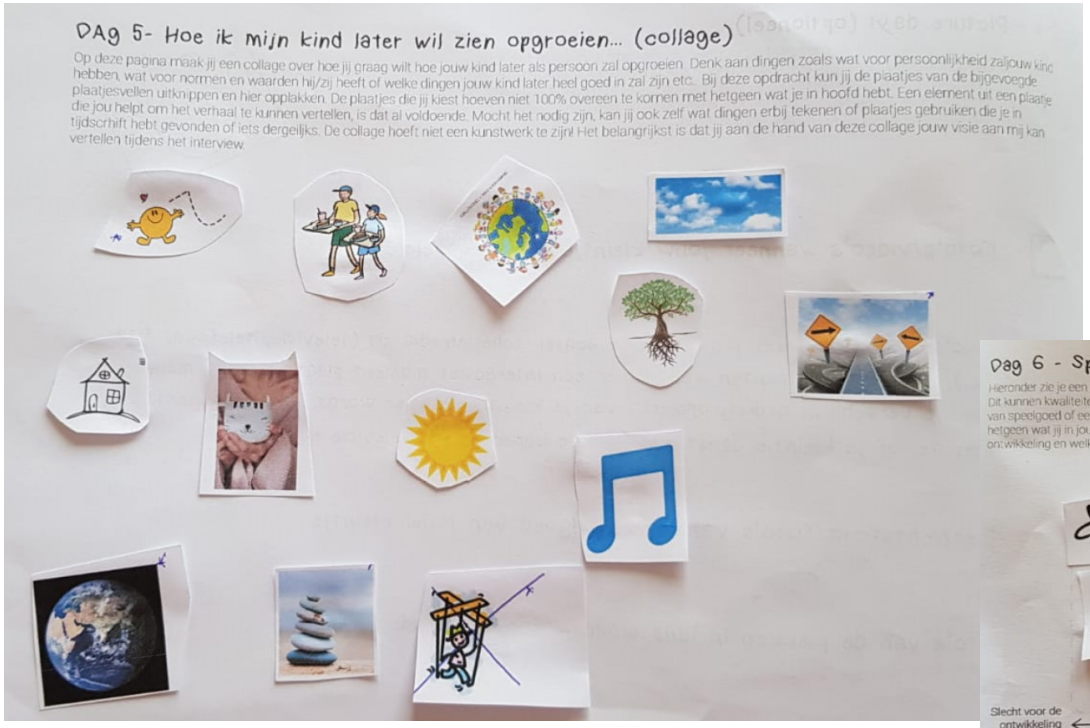
Tjitske

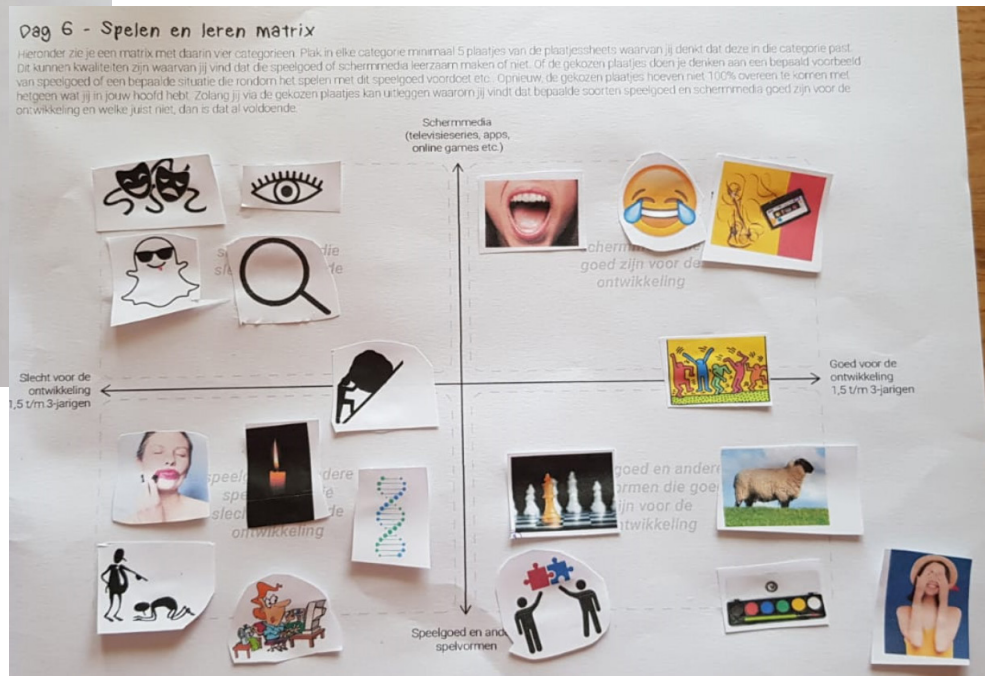
A.3 Results context mapping session








DAg 5- Hoe ik mijn kind later wil zien opgroeien... (collage)
Op deze pagina maak jij een collage over hoe jij graag wilt hoe jouw kind later als persoon zal opgroeien. Denk aan dingen zoals wat voor persoonlijkheid zal jouw kind hebben, wat voor normen en waarden hij/zij heeft of welke dingen jouw kind later heel goed in zal zijn etc.. Bij deze opdracht kun jij de plaatjes van de bijgevoegde plaatjesvellen uitknippen en hier opplakken. De plaatjes die jij kiest hoeven niet 100% overeen te komen met hetgeen wat je in hoofd hebt. Een element uit een plaatje die jou helpt om het verhaal te kunnen vertellen, is dat al voldoende. Mocht het nodig zijn, kan jij ook zelf wat dingen erbij tekenen of plaatjes gebruiken die je in tijdschrift hebt gevonden of iets dergelijks. De collage hoeft niet een kunstwerk te zijn! Het belangrijkst is dat jij aan de hand van deze collage jouw visie aan mij kan vertellen tijdens het interview.


Dag 6 - Spelen en leren matrix
Hieronder zie je een matrix met daarin vier categorieen. Plak in elke categorie minimaal 5 plaatjes van de plaatjessheets waarvan jij denkt dat deze in die categorie past. Dit kunnen kwaliteiten zijn waarvan jij vind dat die speelgoed of schermmedia leerzaam maken of niet. Of de gekozen plaatjes doen je denken aan een bepaald voorbeeld van speelgoed of een bepaalde situatie die rondom het spelen met dit speelgoed voordoet etc.. Opnieuw, de gekozen plaatjes hoeven niet 100% overeen te komen met hetgeen wat jij in jouw hoofd hebt. Zolang jij via de gekozen plaatjes kan uteggen waarom jij vindt dat bepaalde soorten speelgoed en schermmedia goed zijn voor de ontwikkeling en welke juist niet, dan is dat al voldoende.
Schermmedia (televisieseries, apps, online games etc.)
Slecht voor de ontwikkeling 1,5 t/m 3-jarigen
Goed voor de ontwikkeling 1,5 t/m 3-jarigen
Speelgoed en and spelvormen

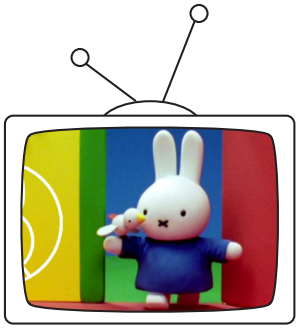
A.4 Parent's opinion about current tv shows

Eventually, the parents are in control what their child is going to watch. Their opinion whether the tv show is enjoyable or educational can be a huge influence if they let their child watch the show.

This analysis about the opinions of several tv shows is derived from the parents which participated in the interviews. The group consisted of 5 mothers and 1 dad.

It is interesting to see what we can learn from the most popular tv shows and which elements we could derive and implement wihtin the Pixifox' series. But evenly important are the elements which parent consider negative within series and tend to avoid.

- time per episode
- perceived as eduactional by parents
- child's favorite
- both child and parent like to watch
- considered as garbage or annoying by parent



Nijntje (age 1.5-3 years)

5 min

What parents think:

+ Slow pace of events, not to many things on screen, not too many colors leads to a good amount of impulses for the child.

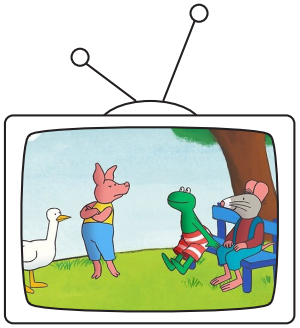
+ Child learns shapes, colors and words

+ Likes the style how it is made, very simple and the atmosphere is warm and homely, in Dutch "gezellig"

+ Parents feel a sense of nostalgia when watching the show

+ Child is already familiar with Nijntje, due to the Nijntje books which they already read before the series.

+/- After a while the first Nijntje series get too simple for the child when he reaches the age around 2. Parents can let their child wath the longer stories of Nijntje, which are around the 15 minutes and include more story line.



Kikker & Vriendjes (age 2-3 years)

20 min

What parents think:

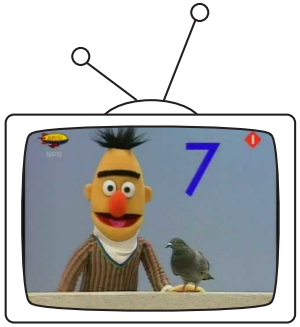
+ Both parents and child like the story line

+ Parents have the idea that their children learn a lot about the basic emotions people can have and why they are having them. Ex. Kikker is sad, because friend is sad. Friend is sad because they lost something. Kikker is going to help to cheer them up.

+ Parents feel a sense of nostalgia when watching the show

+ Parents like how the show looks.

- After a while parents get highly annoyed by the character Kikker, because he is always sad or negative within the story. Although parents understand it is good for the child, they have difficulties to watch along with the series after a while.



Sesamstraat (age 3+ years)

20 min

What parents think:

+ Child learns words, shapes, lettres and colors.

+ Parents like that Sesame Street has often one central learning theme within their episodes that they are going to explore from different perspectives among the different sketches. This way childen can focus on one topic and learn different meanings around this topic. Ex. the central theme is dog. In one sketch they will explore what kind of sounds a dog makes. In another sketch they will show children with their dogs who tell why they love their dogs.

+ No weird camera cuts or angles which distract the child from the learning objective.

+/- Not all content is appropriate for the child. Sometimes there are sketches which are too complex for the child to understand. But parents have faith that the child will learn from the sketches they do understand.

Juf Roos (age 2-3 years)

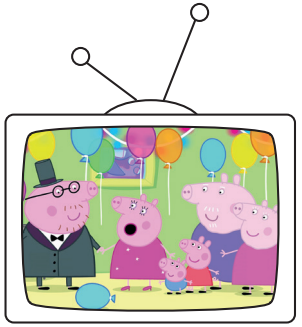
5 min

What parents think:

+ Child like to see that their child is actively engaged with the program, by singing and dancing along with Juf Roos.This way they get better control over their bodies and singing develops language. Therefore Juf Roos has educational value.

+ Parents like the story line. They especially like the male character Gijs and his goofiness.

+ Parents enjoy the music style. It is not staged like the new electronic Sinterklaas songs.



Peppa Pig (age 2-3 years)

4,5 min

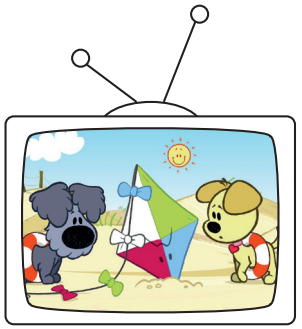
What parents think:

+ Both parents and child enjoy the story line and think the story line is funny

+ Parent like the visual atmosphere of Peppa. It is simple and has a warm and homely ("gezellig")atmosphere.

+ Peppa explores a lot of new things, like going to Paris or going to the Jungle. Parents think that has some educational value, but this value is not as great compared to series like Nijntje, Kikker, Sesame Street and Juffrouw Roos.

+ For some parents, Peppa has extra educational value since it is also available in English. They sometimes will set the language on English and believe that child will learn some words from it.



Woezel&Pip (age 2-3 years)

5 min

What parents think:

+ Parents like the visual style of Woezel & Pip. They think it is cute.

+ Woezel and Pip is centred around the idea that they are there for each other and you should act nice towards others. This is an element that parents would like to show to their kids as an example.

+ Woezel and Pip is centred around things and events that happen daily, which is close to the child's own world and can therefore easily relate to.

Wordparty (age 2.5-3 years)

13 min

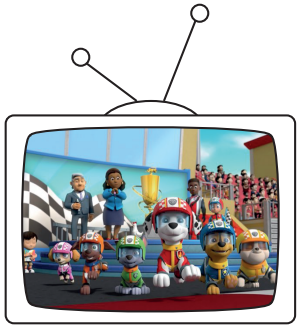
What parents think:

+ :Learn children words, shapes and colors.

- Parents find the characters very annoying. The characters are extremely happy and too present.

- Parents don't like the weird tv screen that shows new words, which is almost a weird unrecognizable and distracting thing on screen.

- Parents don't like the atmosphere presented within the series. The environment and overall style of the series is described as cold and sterile.

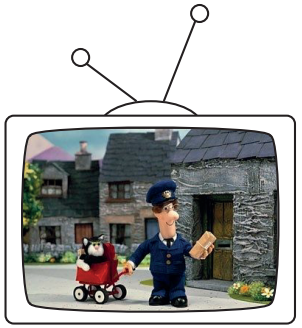


Paw Patrol (age 3+ years)

11 min

What parents think:

+/- Parents don't have strong feelings towards this series. Children tend to watch this show after they reached the age of 3 and start to understand/handle the impulses that



Pieter Post (age 2-3 years)

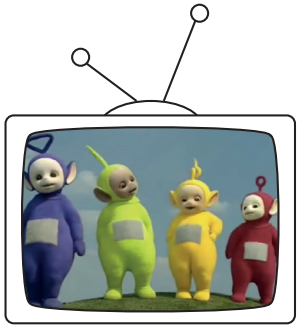
15 min

What parents think:

+ Parent like the visual atmosphere of Pieter Post. It is simple and has a warm and homely ("gezellig")atmosphere.

+ Colors that are used are not overstimulating. Not everything is bright, and background features are less salient.

+ Parents admire stop-motion work. The way how it is made creates a different kind of aesthetic around the series.



Teletubbies (age 1.5-2 years)

23 min

What parents think:

- No meaningful content is presented. Events happen to be random, and the Teletubbies only talk in gibberish to each other. In the eyes of the parents no educational value can be derived. Teletubbies is rather a high visualauditory stimulus that isn't needed for its particular age group.

General insights

- **The visual style of the series can be an influence for parents to let their child watch the series.** Parents prefer series who present the world as a safe, soft, warm and homely space. It sets an example of how the world could be and they hope their child can act towards this world. Stop-motion and 2D-animated series present this atmosphere quite well. 3D-animated shows do less good of a job in creating that atmosphere at the moment. "Word Party" was by some parents even heavily disliked, since it presented a sterile atmophere were the characters live in. Even though the program's focus was likely to prevent distracting the childen with too many irrelevant background objects, parents didn't see that point and wouldn't let their children watch this show.
- **Parents think it is important that series show topics that happen in everyday life and are close to their child's own world.** This way, parents see the opportunity that series can teach the child more about the world around him. Like going to the supermarket and what kind of stuff you can buy there, or explore bugs in the backyard.
- **Overstimulating salient features like harsh sounds, fast paced events, many camera cuts, no distinction between objects of importance, too many bright colors are for parents a main indicator for preventing their child to watch a certain series.** It affects their child negatively, and they state that their children eventually also ask to turn the series off when featurs become to overstimulating. 3D animated series. Nijntje and Sesamstraat on the other hand do an excellent job in "impulse management" according to the parents. and therefore increases their eduactional value.
- **Showing different kind of the basic emotions (happy, sadness, surprised, interest) and why people are having them are considered highly educational by parents. However the emotions shown should be present but not exagerated**, like 'Word Party', where the characters are overly happy all the time. Kikker&Vriendjes is an example which explains these emotions in a more neutral and natural way, which makes it perhaps more meaningful to the child.
- **It is important for parents that the tv series use a clear articulated and slow speech.** Nijntje is an excellent example for this. This way children have time to understand what is said, and can recognize and learn new words. Programs which involve a lot of gibberish, like the Teletbubbies, are perceived as garbage. It doesn't teach children anything and it only distracts them.
- **Parents prefer child's music that is not too heavily staged (Ex. electronic Sinterklaas songs). They prefer more salient songs, like Juffrouw Roos.**

Next steps:

- **Analyze the most educational series on their use of formal features for impulse management. These can be used as guidelines for the design template.** Programs which are perceived as impulse appropriate are Nijntje, Sesamstraat & Kikker&Vriendjes. But also series which have less impulse appropriate for the age group 1,5 to 3 years old are analyzed as markers when features become too much, like WordParty, Paw Patrol (age 3+ years), Peppa Pig.
- **It might be interesting to experiment with the series visual features in order to make 3D animated series feel more homely and warm.** Perhaps some features can be borrowed from stop-motion and 2D animated series, like use of colours, textures and stop-motion like movements.
- **Research what kind of words and sentences can be used within the narrative.** In what way can we explain the child certain concepts shown on television. What words are already familiar. And what are simple sentence structures?
- Singing and dancing is perceived as one of the main benefits television has to offer for the toddler's development. However there are a lot of succesful series that include sing and dance, like Juffrouw Roos. If Pixifox Animation decide to include sing and dance within their series, **it would be interesting to see in what ways the educational value of sing and dance could be increased or add value in another way.** Perhaps more social-emotional lessons could be learned through sing and dance, or assignments could be added which stimulate the cognitive development.

A.5 Analysis on dialogue speed of current toddler series

Nijntje (NL)

Sentence	Zin	Amount words	Klanken	Sec	Duration	Rust volgende zin	Rust volgende zin Corrected	Pace (words/sec)	Pace (klanken/sec)	Rust correctie Pace (words/sec)	Rust correctie pace (klanken/sec)
1	Nijntje's vader is erg tr	8	11	42.36	2.88	0.92	0.92	2.8	3.8	2.0	2.7
2	Hij vindt het leuk om h	19	25	46.16	4.68	0.48	0.48	4.1	5.3	3.2	4.3
3	"Mooi weer", zegt hij	9	12	51.32	3.60	0.92	0.92	2.5	3.3	1.9	2.5
4	"Dus kunnen we een ri	12	16	55.84	3.36	3.00		3.6	4.8	2.6	3.5
5	"Waar zullen wij naart	8	12	62.20	2.52	0.80	0.80	3.2	4.8	2.2	3.2
6	"We kunnen bij tante T	10	13	65.52	3.36	1.16	1.16	3.0	3.9	2.2	2.9
7	"Misschien wilt zij ook	10	12	70.04	2.72	1.52	1.52	3.7	4.4	2.6	3.1
8	"Oja, het is leuk als tar	12	15	74.28	4.44	0.68	0.68	2.7	3.4	2.1	2.7
9	Daar gaan ze dan	4	4	79.40	0.96	3.08	3.08	4.2	4.2	1.9	1.9
10	Bij het huis van tante T	12	16	83.44	3.92	1.04	1.04	3.1	4.1	2.4	3.1
11	Er hangt een briefje op	7	8	88.40	1.48	0.92	0.92	4.7	5.4	2.6	3.0
12	Vader Pluis leest hardo	13	19	90.80	5.16	0.68	0.68	2.5	3.7	2.1	3.0
13	"Later terug"	2	4	96.64	1.00	0.92	0.92	2.0	4.0	0.9	1.8
14	"Zullen wij ook naar Bo	10	15	98.56	3.20	2.36	2.36	3.1	4.7	2.3	3.4
15	Dus rijden ze het bos in	11	16	104.12	3.40	3.52		3.2	4.7	2.4	3.5
16	Er liggen allemaal blaa	7	11	111.04	1.92	0.88	0.88	3.6	5.7	2.3	3.5
17	Als ze erover heen rijd	19	28	113.84	5.80	0.96	0.96	3.3	4.8	2.7	4.0
18	"Ach", zegt vader Pluis	8	11	120.60	2.40	0.92	0.92	3.3	4.6	2.2	3.1
19	"'t zijn maar een paar	13	18	123.92	3.56	0.68	0.68	3.7	5.1	2.7	3.8
20	Vlakbij bij het huis van	13	18	128.16	3.72	0.80	0.80	3.5	4.8	2.7	3.7
21	Vader Pluis ziet niet da	13	17	132.68	4.48	1.88	1.88	2.9	3.8	2.3	3.0
22	"Sssssssssssssssh", do	6	7	139.04	3.12	1.60	1.60	1.9	2.2	1.4	1.6
23	"Ooh nee", zegt moed	5	6	143.76	2.48	0.48	0.48	2.0	2.4	1.4	1.6
24	"We hebben een lekke	5	7	146.72	1.40	2.20	2.20	3.6	5.0	1.9	2.7
25	"Wie legt er nou ook d	14	18	150.32	4.60	1.60	1.60	3.0	3.9	2.4	3.1
26	"Ik zag ze te laat en ik	14	15	156.52	3.08	2.12	2.12	4.5	4.9	3.3	3.5

Conclusies

Average rest	1.18						
Average woorden per zin	9.4						
Average klanken per zin	12.6						
Gemiddelde duur zin	2.91						
Gemiddelde duur zin + rust	4.09						
Max aantal woorden	19						
Max aantal klanken	28						
Min rust	0.16						
Max duur zin	5.80						
Minuut	1	2	3	4	5	Totaal episode	Average per minuut
Totaal woorden per minuut	136	128	106	124	23	517	124
Totaal klanken per minuut	198	172	134	169	35	708	168
		Woorden per minuut					
Pace (words/sec)	3.3	195					
Pace (klanken/sec)	4.3	257					
Rust correctie Pace (words/sec)	2.2	133					
Rust correctie pace (klanken/sec	2.9	176					
Duur average zin (words/sec)	2.89			Min	Max		
Duur average zin (klanken/sec)	2.94		Range wo	124	139		
Duur average zin + rust (words/s	4.07		Range kla	168	183		
Duur average zin + rust (klanken	4.12						
Correctie words per second	2.3	139	Guideline max. aantal woorden per minuut				
Correctie klanken per sentence	3.1	183	Guideline max. aantal klanken per minuut				

Peppa Pig (EN)

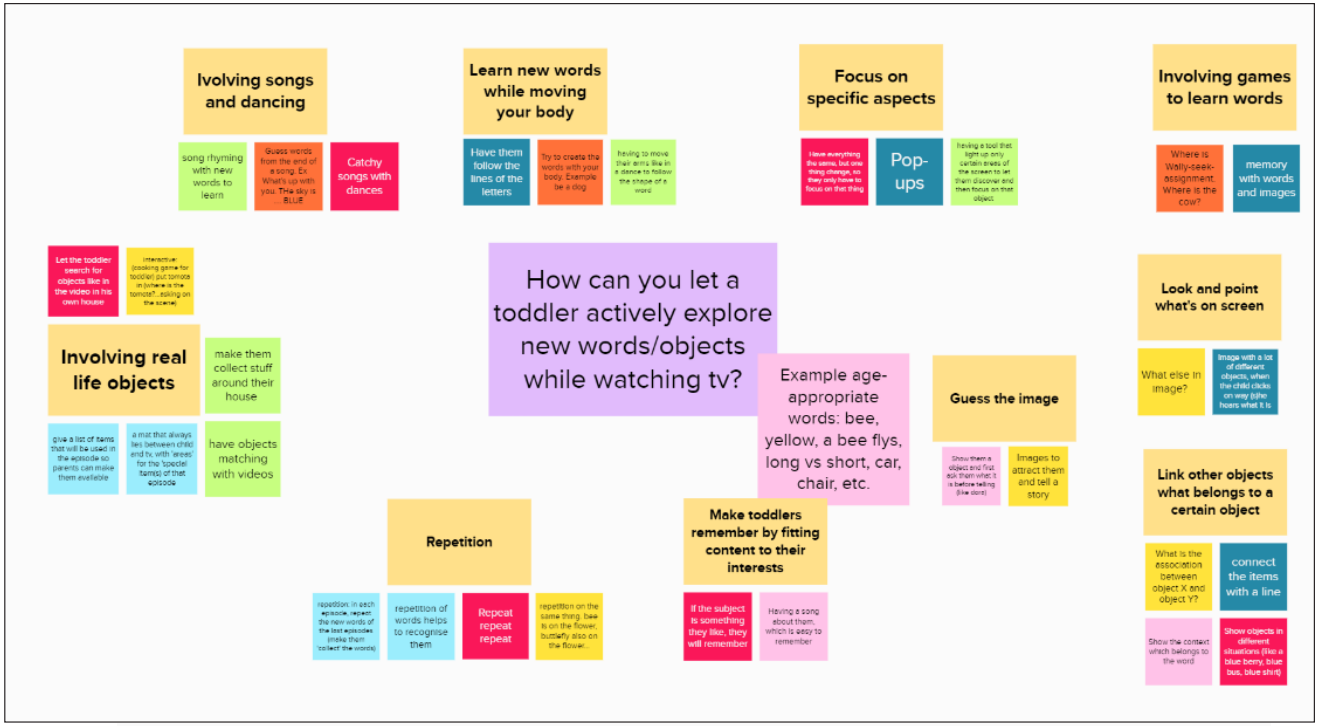
Sentence	Zin	Amount words	Klanken	s	Sec	Timestamp end Sec	Duration	Rust volgende zin	Rust volgende zin Corrected	Pace (words/sec)	Pace (klanken/sec)	Rust correctie Pace (words/sec)	Rust correctie pace (klanken/sec)
1	Very hot day	3	4		18.16	19.80	1.64	1.40		1.8	2.4	1.3	1.8
2	The sun is shinir	4	5		21.20	22.44	1.24	0.32	0.32	3.2	4.0	2.2	2.7
3	It is a very hot d	6	7		22.76	24.36	1.60	0.44	0.44	3.8	4.4	2.7	3.2
4	"Knor, what a lo	6	8		24.80	26.96	2.16	1.44		2.8	3.7	2.2	2.9
	"hahahahaha"				27.32	30.16							
5	Peppa and Geor	7	9		28.40	30.24	1.84	0.48	0.48	3.8	4.9	2.9	3.7
6	They are going t	8	11		30.72	32.28	1.56	0.20	0.20	5.1	7.1	3.7	5.1
7	"I love muddy p	4	6		32.48	34.24	1.76	1.56		2.3	3.4	1.7	2.5
	"Ooohh"				35.80	36.32		0.40	0.40				
8	Ooh dear, the su	13	14		36.72	40.36	3.64	0.92	0.92	3.6	3.8	3.1	3.3
9	"Mommy, Daddy	13	16		41.28	46.12	4.84	0.36	0.36	2.7	3.3	2.4	2.9
10	"Nevermind Peg	12	19		46.48	51.40	4.92	0.36	0.36	2.4	3.9	2.2	3.4
	"Knor"				51.40	51.56		0.20					
11	"Yes, the pudde	4	6		51.76	53.48	1.72	1.00	1.00	2.3	3.5	1.7	2.6
12	"First you need t	9	11		54.48	57.44	2.96	0.08		3.0	3.7	2.5	3.1
13	"Yes mommy!"	2	3		57.52	58.64	1.12	5.84		1.8	2.7	1.2	1.7
14	Peppa and Geor	8	12		64.48	66.72	2.24	0.48	0.48	3.6	5.4	2.8	4.2
15	Mommy Pig is w	7	11		67.20	69.24	2.04	0.44	0.44	3.4	5.4	2.7	4.2
16	And Daddy Pig is	8	12		69.68	72.24	2.56	0.04	0.04	3.1	4.7	2.5	3.8
	"Knor"				72.28	72.48		0.24	0.24				
17	"Because it's so	8	9		72.72	75.48	2.76	0.36	0.36	2.9	3.3	2.4	2.7
	Sqsssssht				75.84	76.40							
18	"Yuuuuuch, so o	5	7		78.76	82.00	3.24	3.36	3.36	1.5	2.2	1.3	1.8
	"Yuuuuch"				85.36	86.04		0.48	0.48				
	"Ohohohohoh, what a fuzz about not				86.52	89.68		0.24					
19	"What a fuzz abc	5	7		87.76	89.68	1.92	0.24	0.24	2.6	3.6	2.0	2.8

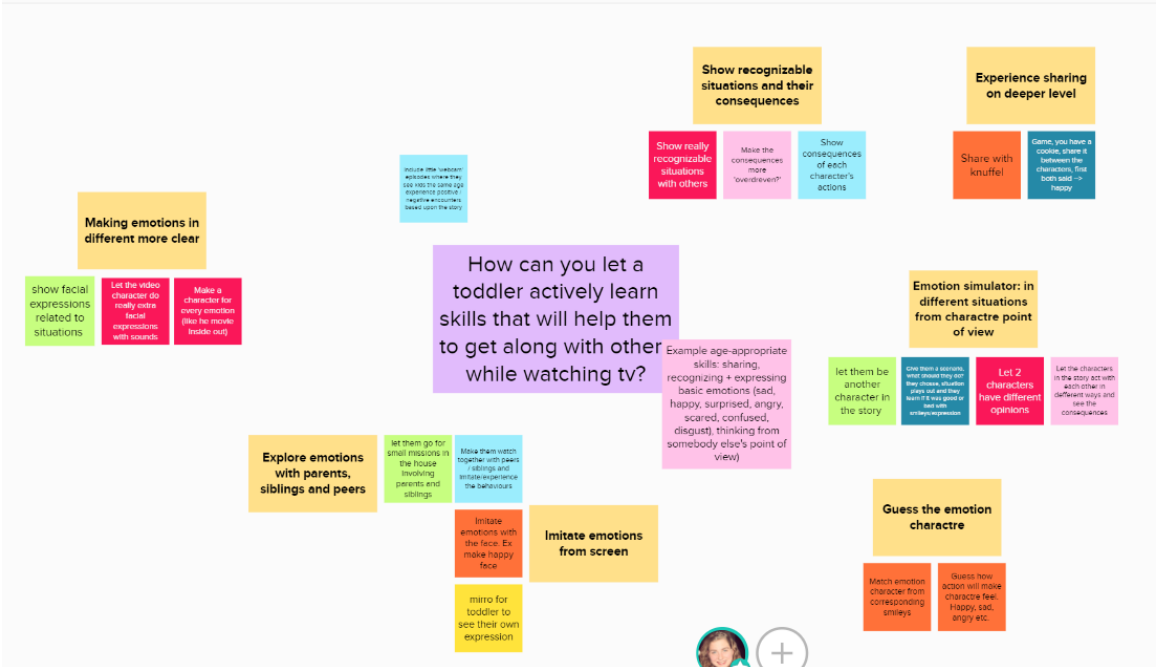
Conclusies

Average rest	0.60							
Average woorden per zin	6.95							
Average klanken per zin	9.3							
Gemiddelde duur zin	2.41							
Gemiddelde duur zin + rust	3.01							
Max aantal woorden	13							
Max aantal klanken	19							
Min rust	0.04							
Max duur zin	4.92							
Minuut	1	2	3	4	5	Totaal episode	Average per minuut	
Totaal woorden per minuut	122					122	122	
Totaal klanken per minuut	170					170	170	
		Woorden per minuut						
Pace (words/sec)	2.9	176						
Pace (klanken/sec)	3.9	235						
Rust correctie Pace (words/sec)	2.3	137						
Rust correctie pace (klanken/sec)	3.1	183						
Duur average zin (words/sec)	2.37			Min	Max			
Duur average zin (klanken/sec)	2.36		Range wo	122	141			
Duur average zin + rust (words/se	2.97		Range kla	170	188			
Duur average zin + rust (klanken/	2.95							
Correctie words per second	2.3	141	Guideline max. aantal woorden per minuut					
Correctie klanken per sentence	3.1	188	Guideline max. aantal klanken per minuut					

B.1 Ideation

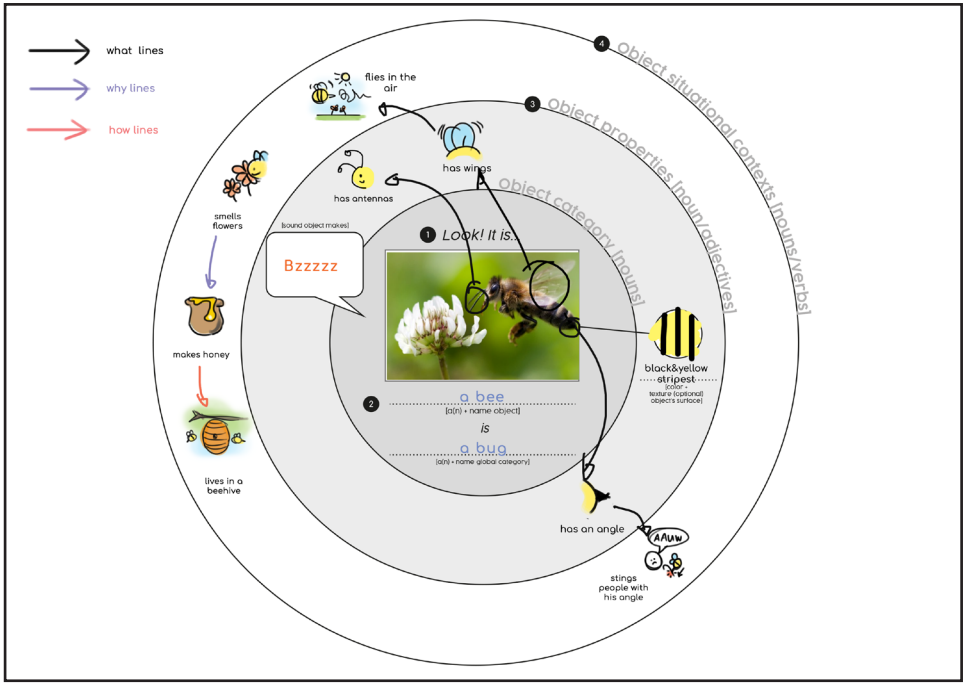
An online ideation session was held about gaining new ideas of how a toddler can be actively engaged when watching television. Different ideas of possible response moments were generated.

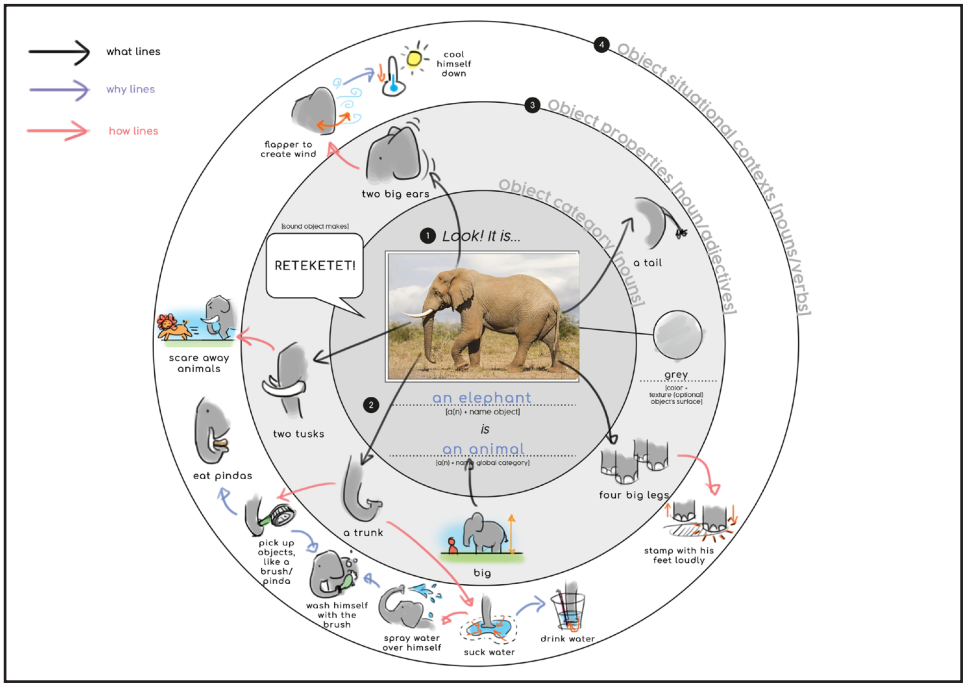


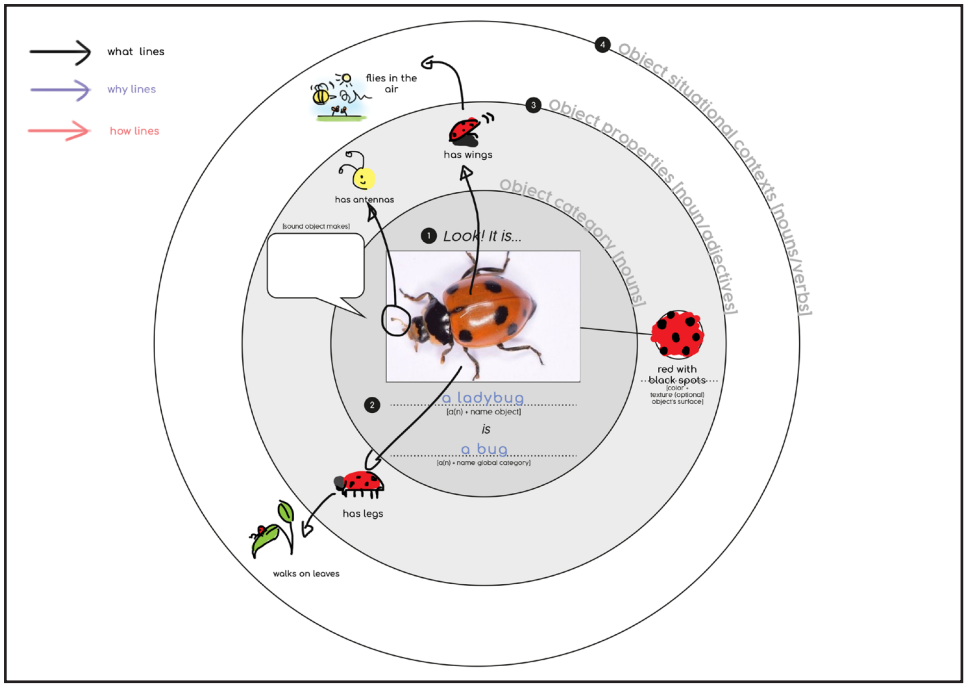


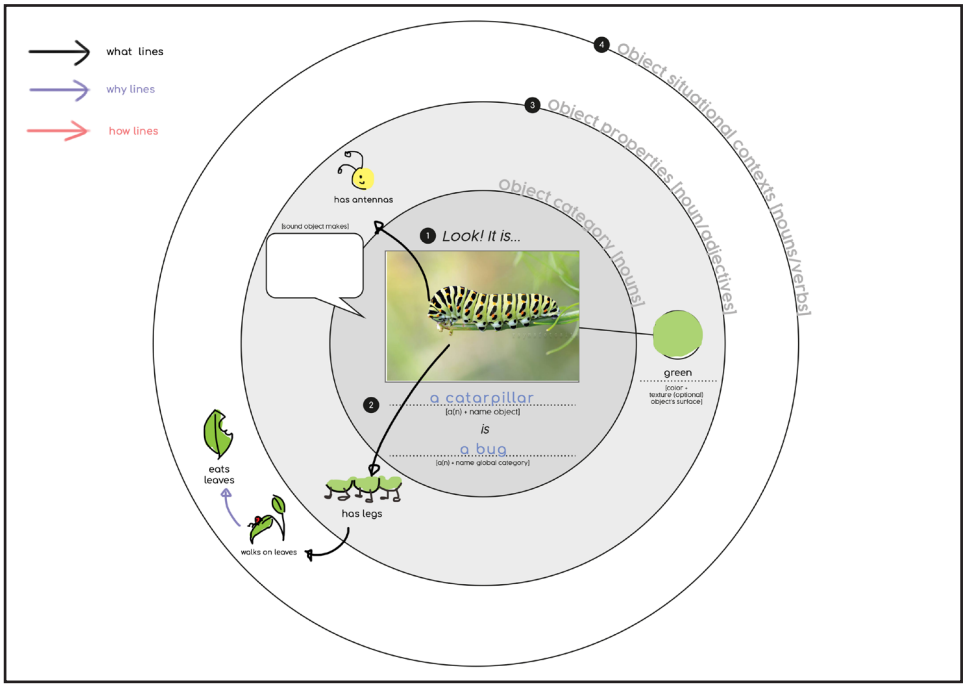
Providing familiar scenes
A trigger: first relate to their daily life first.
Make things unscary by reasoning the situation
focusing on details of new situations and new perspective ins perspective of the lamp in the dark or teeth in the darkst situation
make themlive through the fantasy as a fantasy, clearly not reality
Show them why it is not scary. Relevate the problem
Show a scary situation and then something that shows that it is not scary (really cute monster out of the dark)
showing the bright side of it
Play around in bath, creating more foam, more, more, o-oh too much
Explore the situation playfully
Hidden in the forest, so paying attention to details and be sharp you see everything
Make it into a catchy song
Let them repeat movements corresponding with daily situation
How can you let a toddler actively explore new (possibly scary) daily situations while watching television?
Age-appropriate example siutations: doing grocerles, taking a bath, cooking dinner, going to the dentist (scary), going to bed in the dark (scary)
Explore the world together with characters or knuffels
A trigger: do you heve some toys with you? ask for the accompanying
'do it together' join the main character who comforts the child.
show behaviour: how to cope with the situation (positive role models)
Let a character experience the situation
have a virtual peer by them.
Click on choices screen and reroute to different video
Show them a situation and let them choose from some emotions. Based on their answer continue or show them that it is not scary.
Being able to pause at any moment, so they can do it at their own pase
Make it a game, so they have to click on things (like a door/picture/toy) (for yt you may want to go to another video by the clicking)
Give a list and let them pick the right items
Make things unscary by creating a safe atmosphere
Heve 'happy/positive' music in the background
Adjust the brightness in the room, scary monster, night time, make it comfortable
Bring new animal to live within the house
Let the toddler have a "dollhouse" where they can re enact the situation
chase the beetle: under your foot, behind your back, spin around
have a 'map' of the house and a tiny toy beetle to move around the house.
light projection of a beetle
Build a house for the bee
Let the toddler explore the sofa, the plant and outside for themselves (interactive video)
beetle will 'buzz around'; use stereo effects t give hints on how to move
Choose/show between different solving solutions
Directly show the saving results? accept the concept first
Let them choose between options about saving, and play it to see if it was a safe option or not
Learning a certain type of affection towards an object
Also show it from the beetles perspective -> seeing 2 really big dogs (for children, everything is also much bigger than for adults)
show how friendly the beetle is
focus on how they discover he is a friendly animal by playing with it in physical life,...
Have a beetle stuffed animal so the toddler can go along in the story in their own house
Saving an insect from the house
Woezel finds a little beetle in the house. First, he is afraid, but when Pip shows him that the Beatle is just a friendly animal, they rescue her. But where does the beetle live? Under the sofa? In the plant on the window sill or outside in the garden?
How can a toddler actively participate to within this episode?
Ways of indentifying beetle
Hears a zoom... Point where the zoom is coming from
They just saw the beetle, ask them which animal is a beetle showing 3-4 options
Ask where the children think the beetle lives and give them some time to think
Explore new concepts around an animal
let have them choices to discover where the beetle live
where do they live, keep showing different scenes,
Let woezel en Pip visit the beetles house, here the children can learn all about the beetle.
Link different versions of a categorie (type animal) with other version of categories (type house)
Let them push the items to explore what lives where, so finding the home
Compare different kind of houses with each other. Regular house, bee house, dog house
Work with links. Afterward show also examples what lives in different houses
show other animinal lives there maybe

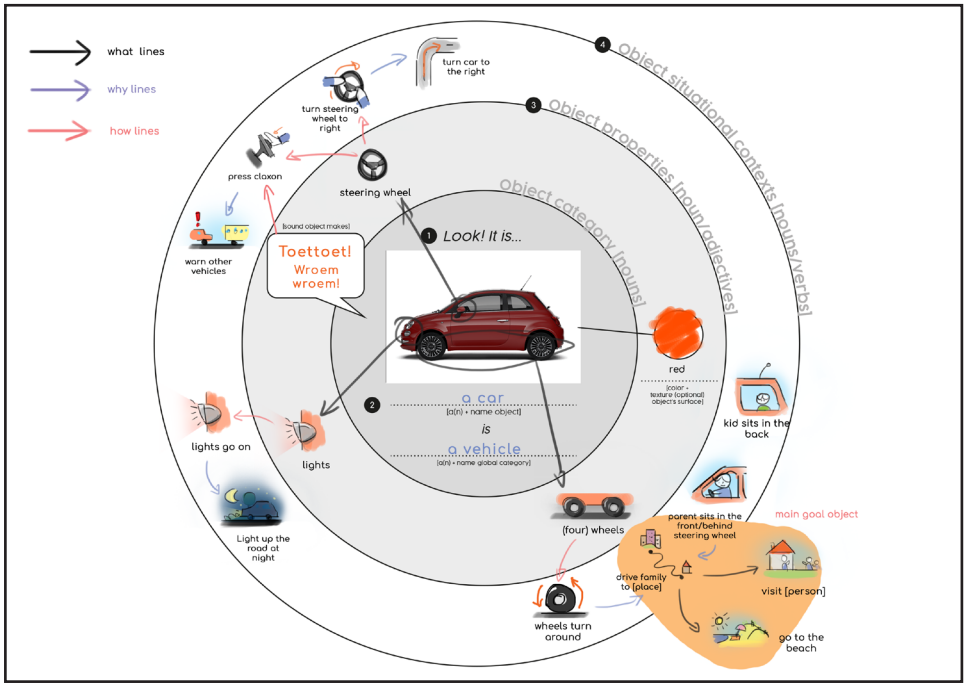
C.1 Testing different themes within the object circle

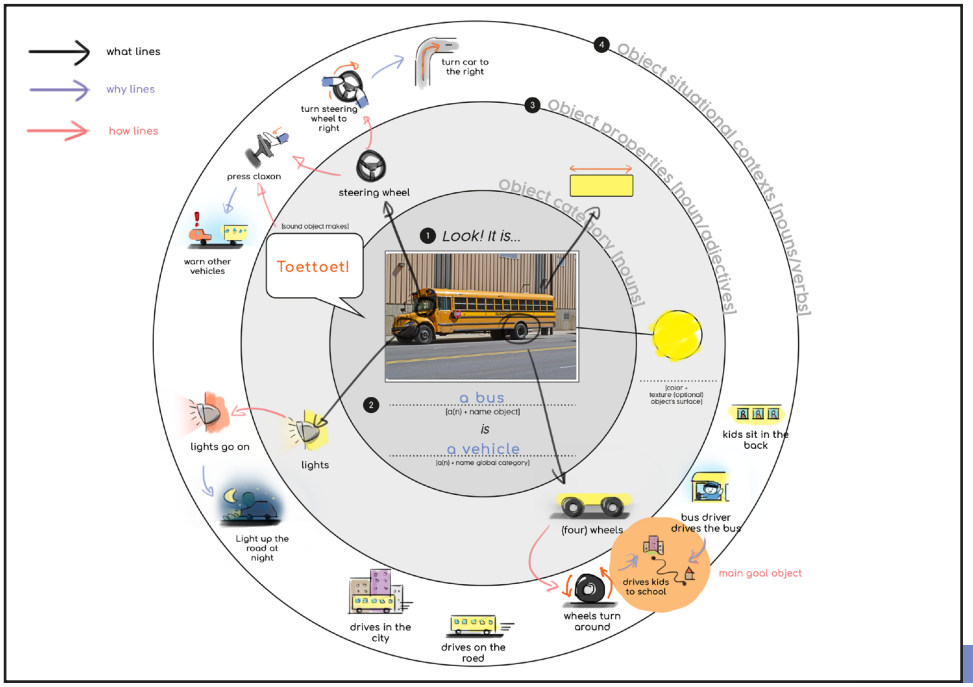





what lines
why lines
how lines
4 Object situational contexts [nouns/verbs]
3 Object properties [noun/adjectives]
Object category [nouns]
flies in the air
has wings
has antennas
[sound object makes]
1 Look! It is...
red with black spots
[color + texture (optional) object's surface]
2
a ladybug
[a(n) + name object]
is
a bug
[a(n) + name global category]
has legs
walks on leaves

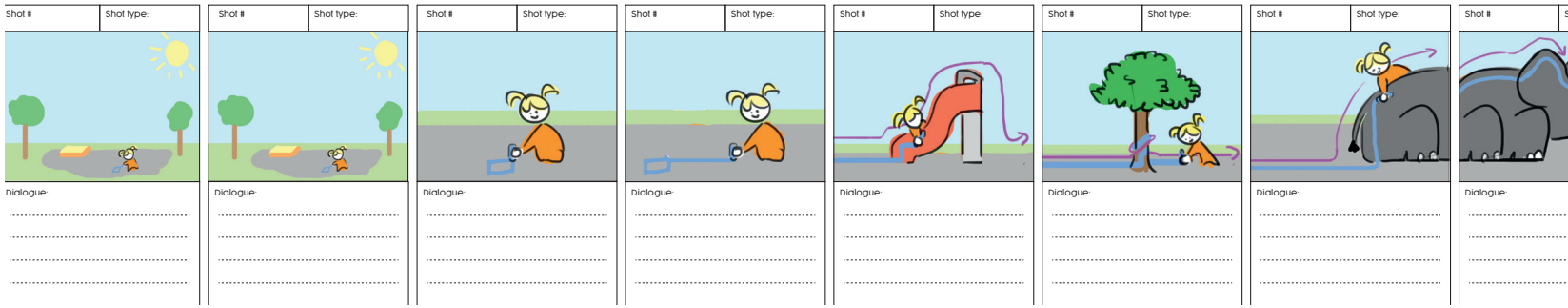

what lines
why lines
how lines
4 Object situational contexts [nouns/verbs]
3 Object properties [noun/adjectives]
Object category [nouns]
has antennas
[sound object makes]
1 Look! It is...
green
[color + texture (optional) object's surface]
2
a caterpillar
[a(n) + name object]
is
a bug
[a(n) + name global category]
eats leaves
has legs
walks on leaves


what lines
why lines
how lines
4 Object situational contexts [nouns/verbs]
3 Object properties [noun/adjectives]
Object category [nouns]
turn car to the right
turn steering wheel to right
press claxon
steering wheel
warn other vehicles
[sound object makes]
Toettoet! Wroem wroem!
1 Look! It is...
red
[color + texture (optional) object's surface]
2
a car
[a(n) + name object]
is
a vehicle
[a(n) + name global category]
kid sits in the back
lights go on
lights
Light up the road at night
(four) wheels
parent sits in the front/behind steering wheel
main goal object
drive family to [place]
visit [person]
wheels turn around
go to the beach

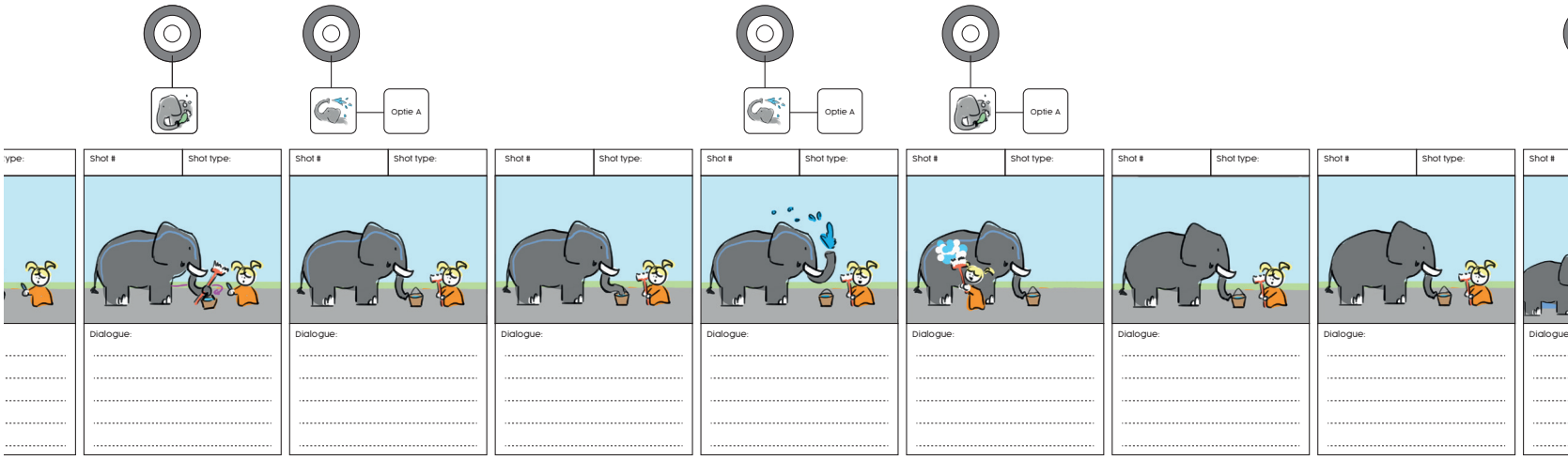

what lines
why lines
how lines
4 Object situational contexts [nouns/verbs]
3 Object properties [noun/adjectives]
Object category [nouns]
turn car to the right
turn steering wheel to right
press claxon
steering wheel
warn other vehicles
[sound object makes]
Toettoet!
1 Look! It is...
[color + texture (optional) object's surface]
2
a bus
[a(n) + name object]
is
a vehicle
[a(n) + name global category]
kids sit in the back
lights go on
lights
Light up the road at night
(four) wheels
bus driver drives the bus
drives kids to school
main goal object
wheels turn around
drives in the city
drives on the road

C.2 Exploration of how a story should be created around a response moment

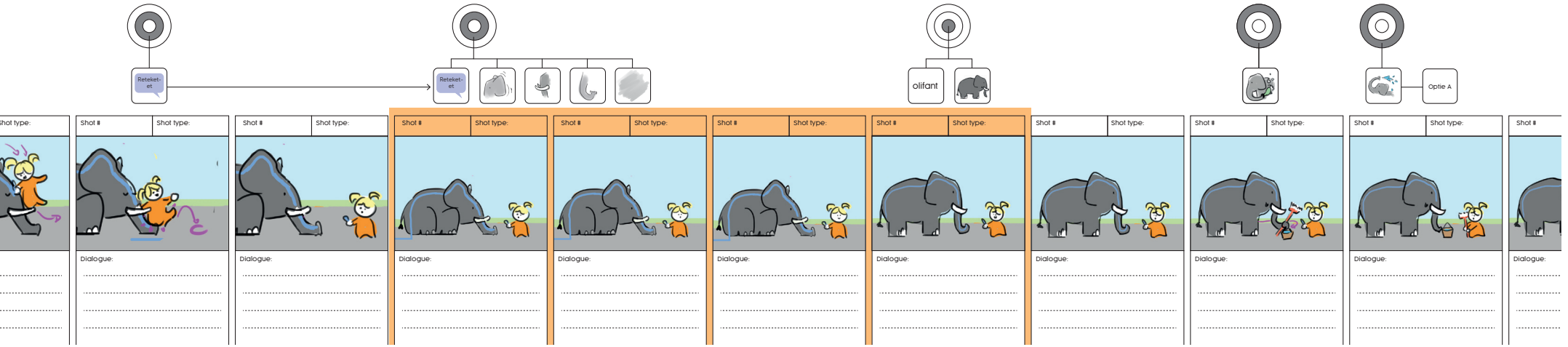
KARAKTER DOET ACTIVITEIT DAT LIJDT TOT ONTMOETING DIER



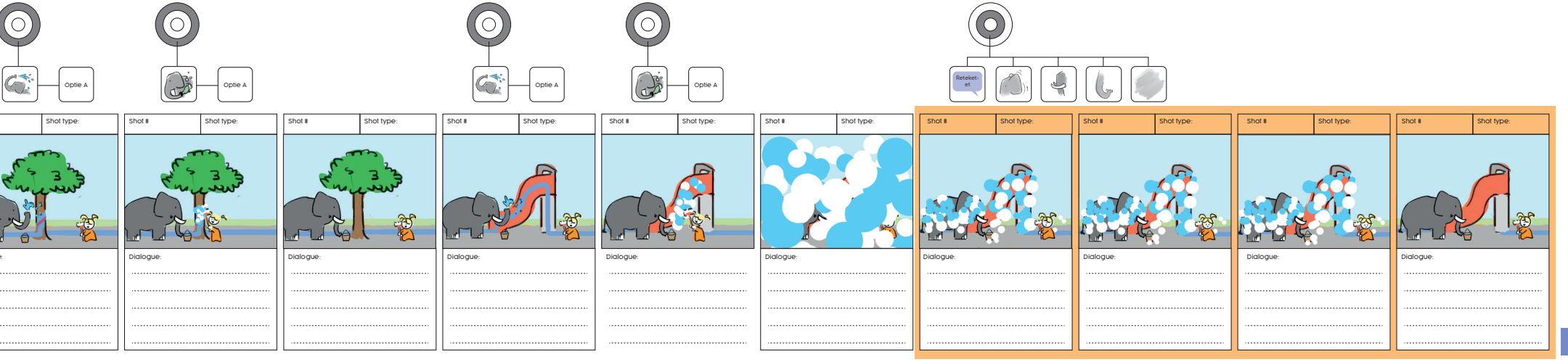
DIER HELPT KARAKTER ZIJN DOEL/PROBLEEM OP TE LOSSEN D.M.V. EEN KWALITEIT DIE HET DIER TYPEERT



KIND LEERT AUDIOVISUELE PLAATJE TE KOPPELEN AAN WOORD



KIND MOET WOORD KOPPELEN AAN AUDIOVISUELE KENMERKEN



C.3 Templates shown on larger scale

On the following pages, all the template (including the backsides) will be shown on a larger scale.

themelist

1 Select one central theme for episode (several examples are shown below)

Animals (noun)

Animals around the house
Dog, Bird, Mouse, Gold fish, Cat

Bugs and small animals
Bee, Worm, Caterpillar, Butterfly, Ladybug

Farm animals
Cow, Rabbit, Sheep, Chicken, Horse, Pig, Donkey

Forrest animals
Bear, Squirl, Fox, Rabbit, Owl, Hedgehog, Beaver, Frog

Animals which live in the water
Fish, Whale, Starfish, Turtle, Dolfin, Seal

Animals which live in the jungle (more difficult!)
Monkey, Koala, Parrot, Snake, Chameleon, Panda, Crocodile, Gorilla

Animals which live in Africa (more difficult!)
Elephant, Zebra, Giraffe, Hippo, Lion, Rhino

People (noun)

Family and close people
Papa, Brother, Mama, Sister, Grandpa, Friend, Grandma, Neighbour

Job occupations
Farmer, Fireman, Lady/Man at the cash desk, Police man, Captain, Baker, Machinist, Hairdresser, Bus driver, Cook, Pilot, Doctor, Sailor, Animal doctor, Handy man, Dentist, Gardener, Teacher, Postman, Professor

Fantasy characters
Pirate, Mermaid, Princess, Clown, Prince

Things (noun)

Food
Fruit, Juice, Vegetables, Bread, Milk

Clothes
Swimming suit, Pants, Shoes, Dress, Raining

Tools
Scissors, Bucket, Brush, Hammer, Broom, Paint

Tools
Vaccuum cleaner, Washing machine, Fridge

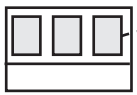
Vehicles
Bike, Tractor, Car, Air balloon, BusBoat, Space ship, Airplane, Ice cream truck, Train

Other
Balloon, Book, Umbrella, Shopping cart, Camera

of course you are free to brainstorm more themes!

Creating an episode's storyboard step-by-step

1 select central theme

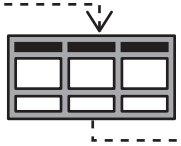


Use the theme list as an inspiration source. Each episode teaches the child about the central theme, which can be novel object or action.

2 explore theme's essential features

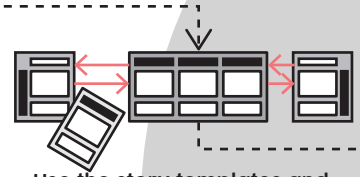
Fill in the brainstorm templates to explore and select features around the theme which fit the level of complexity that a 1.5-3-year-old can understand and learn from.

3 create response moment



Fill in one of the respone moment templates to translate the theme's essential features into a response moment. The response moment will make sure that children will actively think and learn about the theme's essential features

4 add story element



Use the story templates and shot cards to build story around response moment by connecting the templates through answering the story brainstorm questions.

5 DONE!

Congratioulations, your storyboard is finished! Now take a picture of your result and turn your ideas into reality.

themelist

1 Select one central theme for episode (several examples are shown below)

Actions (verb+noun)

Personal care
Brushing your teeth
Going to bed
Washing your hair
Getting dressed
Washing your hands
Taking a bath
Putting on shoes
Going on the potty

Fun things to do
Blowing bubbles
Baking cookies
Eating ice cream
Picking flowers
Swimming in the sea
Swimming in the pool
Kicking the ball
Building a sandcastle

Household activites & life skills
Making dinner
Washing the car
Washing your hair
Waching the dishes
Doing laundry
Building a house
Watering flowers
Doing groceries
Cycling on a bike
Driving the car

* when choosing an action, only use the brainstorm action square template for exploring and selecting features

Places (noun)

Daily places
Home
At a friends
At grandma & grandpa
Playground
Garden
School
Supermarket
Library
Backyard

Special places
Swimming pool
Lake
Sea
Circus
Restaurant
Beach
Forest
Farm
Hospital
Train station
Airport
Zoo

Far away places (more difficult!)
Asia
Australia
Africa
Dessert
North pole
Paris
Moon
Space
Mountains

Time (noun)

Seasons
Winter
Summer
Spring
Autumn

Special occasions
Somebody's birthday
First day of school
Holiday
Easter
Christmas
New Year

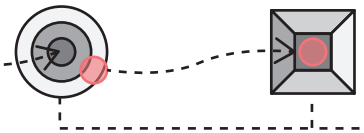
of course you are free to brainstorm more themes!

Creating an episode's storyboard step-by-step

1 select central theme

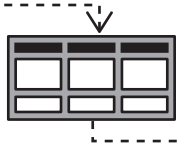
Use the theme list as an insipration source. Each episode teaches the child about the central theme, which can be novel object or action.

2 explore theme's essential features



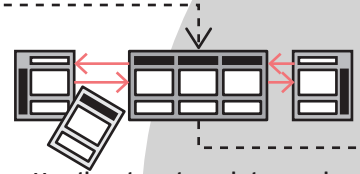
Fill in the brainstorm templates to explore and select features around the theme which fit the level of complexity that a 1.5-3-year-old can understand and learn from.

3 create response moment



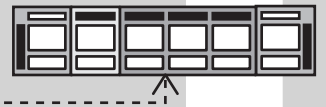
Fill in one of the respone moment templates to translate the theme's essential features into a response moment. The response moment will make sure that children will actively think and learn about the theme's essential features

4 add story element



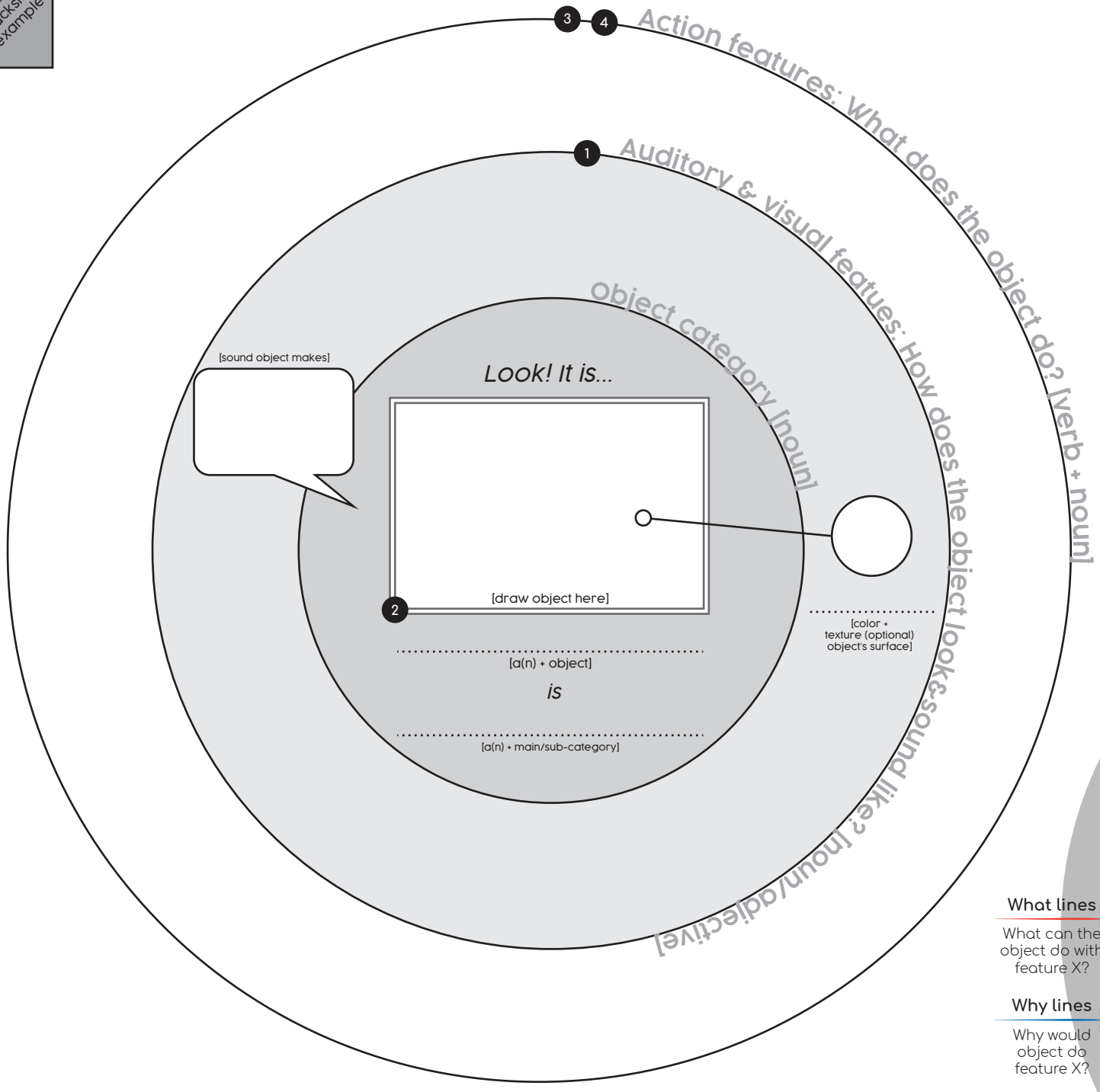
Use the story templates and shot cards to build story around response moment by connecting the templates through answering the story brainstorm questions.

5 DONE!



Congratioulations, your storyboard is finished! Now take a picture of your result and turn your ideas into reality.

see backside for example



What lines

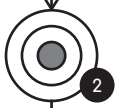
What can the object do with feature X?

Why lines

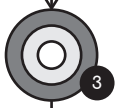
Why would object do feature X?

brainstorm template: object circle

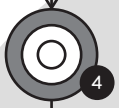
Choose a reference picture of your selected theme. Children rely firstly on shape when they are trying to determine what kind of object they are looking at, such as distinctive (body) parts. So **draw the visual features which are typical for this object** in this circle. Also **add the sound that the object makes** if applicable.



Draw an animated version of your selected theme in the inner circle, by selecting visual features from the previous step.



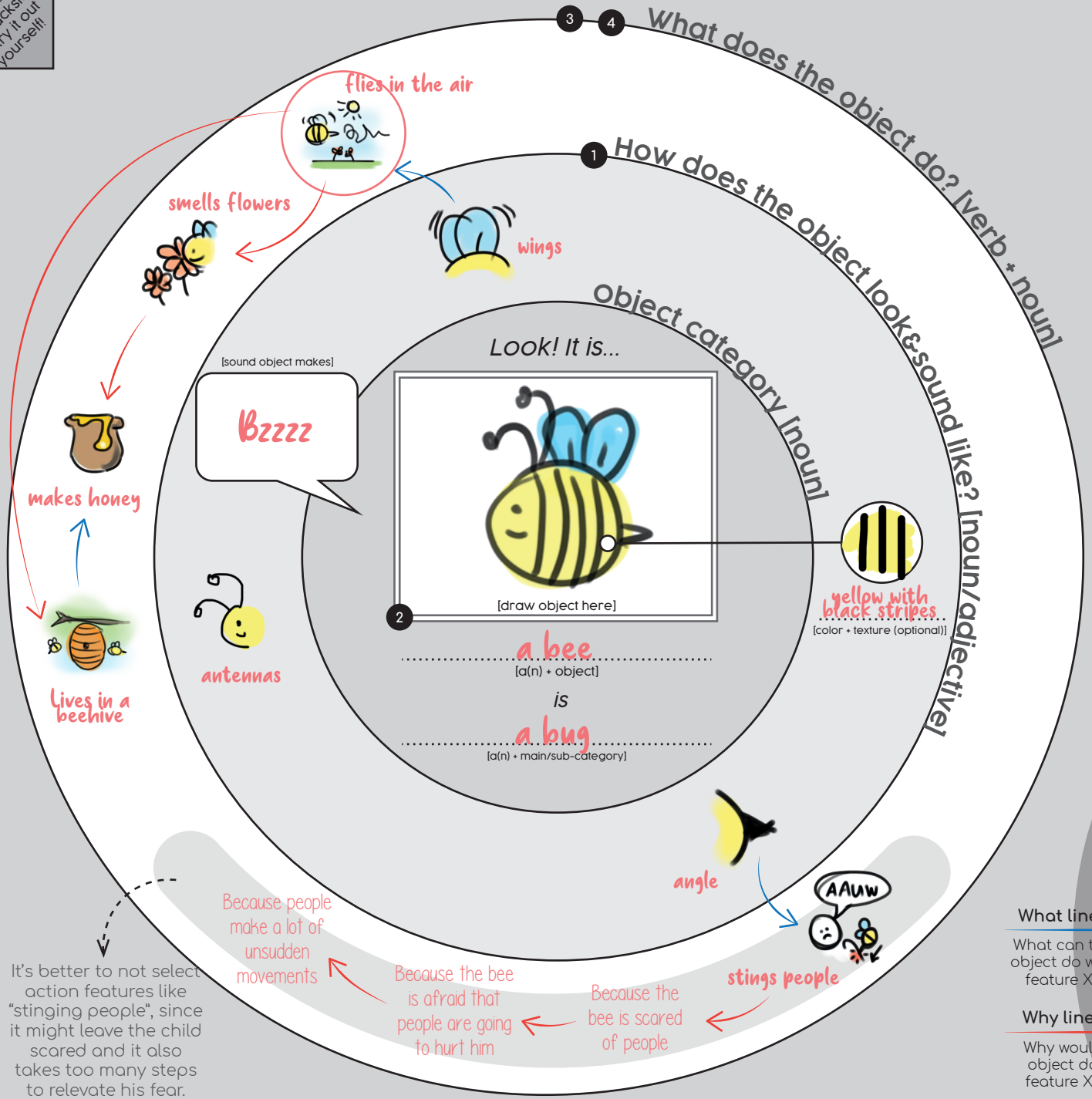
A child learns and recognizes a new object better if a function is added. So **draw what this object typically does (action features)** in the outer circle. You can also use the (body) parts you have drawn in the first step as inspiration. What things can the object do with these parts? **Connect these features between circles with 'What lines'**.



Connect action features with each other with 'What-' and 'Why lines'. By seeing how these features are connected, you can see possible storylines emerge and how complex these storylines can be. By looking at the complexity of the sotrylines, you can see, which featuers are more safe to include within the story and which ones are better to leave out.

Select an action feature you think is interesting for the child to actively explore within the episode. Make sure this feature doesn't take too many steps why the object would do this certain action. Or that the chosen action could be perceived as scary for the child.

see backside to try it out yourself!



It's better to not select action features like "stinging people", since it might leave the child scared and it also takes too many steps to relevate his fear.

What lines
What can the object do with feature X?

Why lines
Why would object do feature X?

brainstorm template: object circle

1. Choose a reference picture of your selected theme. Children rely firstly on shape when they are trying to determine what kind of object they are looking at, such as distinctive (body) parts. So **draw the visual features which are typical for this object** in this circle. Also **add the sound that the object makes** if applicable.

2. **Draw an animated version of your selected theme** in the inner circle, by selecting visual features from the previous step.

3. A child learns and recognizes a new object better if a function is added. So **draw what this object typically does (action features)** in the outer circle. You can also use the (body) parts you have drawn in the first step as inspiration. What things can the object do with these parts? **Connect these features between circles with 'What lines'.**

4. **Connect action features with each other with 'What-' and 'Why lines'.** By seeing how these features are connected, you can see possible storylines emerge and how complex these storylines can be. By looking at the complexity of the sotrylines, you can see, which featuers are more safe to include within the story and which ones are better to leave out.

5. **Select an action feature you think is interesting for the child to actively explore within the episode.** Make sure this feature doesn't take too many steps why the object would do this certain action. Or that the chosen action could be perceived as scary for the child.

see backside for example

4 Which tools/circumstances might the user need to perform this action? (nouns)

5 What "micro-actions" does the user need to do? (verb + noun)

State A

2

[begin/problem state]

1 [draw action here]

[verb + noun]

State C

3

[end/goal state]

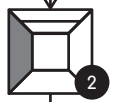
State B

6

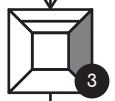
[effect of action sequence]

brainstorm template: action square

Write the action down in the inner square and draw a picture of the action, which contains the following elements: 1) the charactre who does the action, 2) the object who undergoes the action and 3) a visual representation of the action's movement itself.



Make a drawing of the state of the object that undergoes the action before the action is applied. This state will be defined as "State A" and could be considered as problem state that the charactres are trying to solve in the storyline.



Make a drawing of the state of the object that undergoes the action after the action is applied. This state will be defined as "State C" and could be considered as the goal state that the charactres are trying to achievein the storyline.

Now we move on to how this particular action should be executed an what kind of effect it has on the object that undergoes the action. Starting by **drawing the possible tools and circumstances which are needed to execute this action**.

Draw the "micro actions" that the user does to perform the action to visually describe the movement of the action. This way the child can link this movements to the verb.

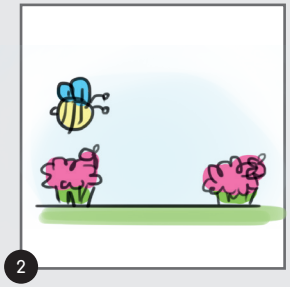
Draw the direct effect the action has on the object that undergoes the effect. This between state B needs to be highlighted in the story, so children understand better how the end goal is reached. by applying the action.

see backside to try it out yourself

4 Which tools/circumstances might the user need to perform this action? (nouns)

5 What "micro-actions" does the user need to do? (verb + noun)

State A



2

being at this bush

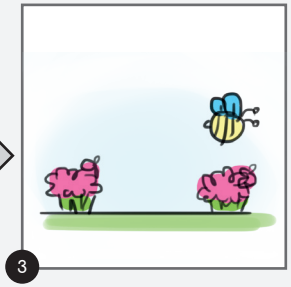
[begin/problem state]

1

fly in the air

[verb + noun]

State C

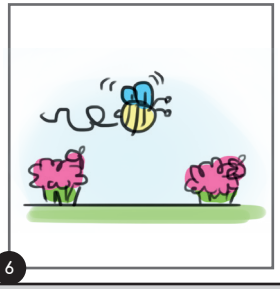


3

being at that bush

[end/goal state]

State B



6

becoming closer to that bush

[effect of action sequence]

brainstorm template: action square

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5 **Draw the "micro actions" that the user does to perform the action** to visually describe the movement of the action. This way the child can link this movements to the verb.

6 **Draw the direct effect the action has on the object that undergoes the effect.** This between state B needs to be highlighted in the story, so children understand better how the end goal is reached. by applying the action.

see backside to try it out yourself

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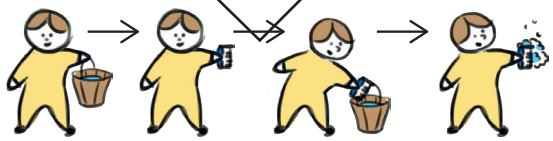
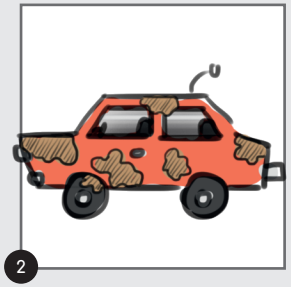


State A



2

the car is dirty

[begin/problem state]

1

washing the car

[verb + noun]

State C

3

the car is clean

[end/goal state]

State B

6

the stains disappear

[effect of action sequence]

brainstorm template: action square

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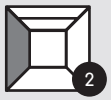

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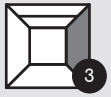

Make a drawing of the state of the object that undergoes the action after the action is applied. This state will be defined as "State C" and could be considered as the goal state that the charactres are trying to achievein the storyline.

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response template: uncovering the mystery object

see backside for example

Story brainstorm questions:
- In what relatable setting or situation could Kiki encounter this mystery object?

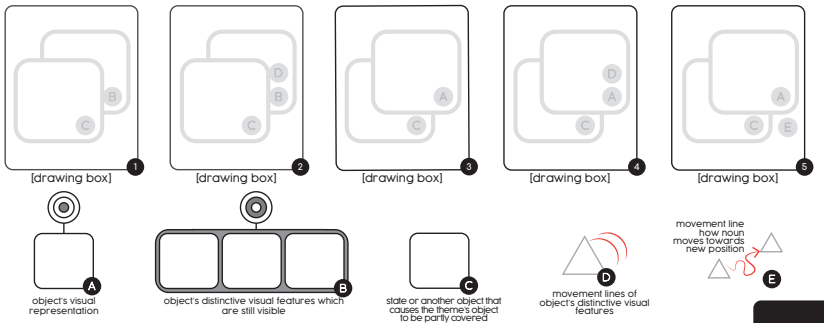
Response type: one-word response

Suitable categories: animals, people, things

Using this template, the child will learn:
- The child learns to link visual representations of objects to their corresponding words.
- The child learns which auditory- and visual features are essential for recognizing a specific object
- The child is stimulated to learn to speak novel words out loud, which improves speech.

Template's storyline: In this scene, Kiki hears a sudden noise and/or sees something moving that is hidden behind a certain object in the scenery (ex. a bee hidden behind a bush, or an elephant covered in mud). The hidden mystery object is the episode's central theme (ex. what is a bee?), and only some of its distinctive visual features are visible (ex. wings, yellow and black stripes body, angle, antennas). These features will serve as cues for the child to recognize what kind of mystery object they are dealing with.

Kiki wants to know what's behind the bushes and asks the viewer if they know what's behind the bushes. The child answers by recognizing the given auditory-visual cues. After some time, the mystery object reveals itself and Kiki provides the child with the correct answer by linking the object's visual representation to its corresponding word.



Story brainstorm questions:
- How can the suddenly appeared object help Kiki further in this story?
- How could the object's action features be used in the story?

shot #	Attract attention towards object's visual features		Let the viewer feel that they need to answer character's question	Attract attention towards the object's visual features	Viewer gives response to character	Give viewer the correct answer by uncovering the object &	Link object's visual representation to word	shot # Link auditory and visual featuers in whole object
	[drawing box] 2	[drawing box] 1	[drawing box] 1	[drawing box] 2	[drawing box] 2	[drawing box] 5	[drawing box] 3	[drawing box] 4
	[sound that object makes, if applicable]	Hey, what [object's main category] is behind [state or thing that covers the object]?	Can you tell me what [object's main category] is behind [state or thing that covers the object]?	[sound that object makes, if applicable]	Ambient "waiting for response" music	Uplifting "appearance of answer" sound	Look it is a [object]!	[sound that object makes, if applicable]
	[avatar object]			[avatar object]				[avatar object]

response template: uncovering the mystery object

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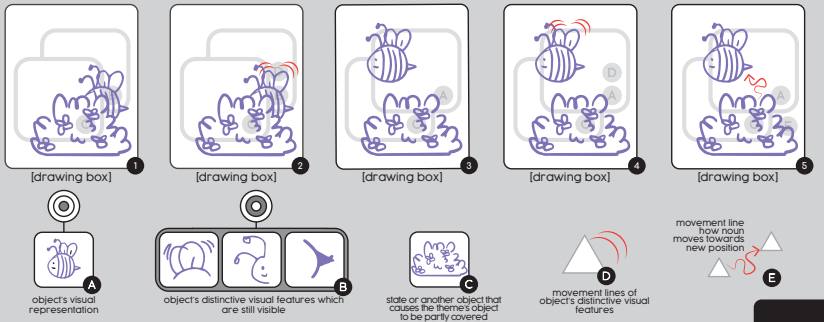

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	[drawing box] 2	[drawing box] 1	[drawing box] 1	[drawing box] 2	[drawing box] 2	[drawing box] 5	[drawing box] 3	[drawing box] 4
	Bzzzzzzz [sound that object makes, if applicable]	Hey, what animal [object's main category] is behind the bushes [state or thing that covers the object]?	Can you tell me what animal [object's main category] is behind the bushes [state or thing that covers the object]?	Bzzzzzzz [sound that object makes, if applicable]	Ambient "waiting for response" music	Uplifting "appearance of answer" sound	Look it is a bee [object]!	Bzzzzzzz [sound that object makes, if applicable]
	[avatar object]			[avatar object]				[avatar object]

response template: hide-and-seek

Response type: pointing response

Suitable categories: animals, people, things

Using this template, the child will learn:

The child is stimulated to actively link the object's distinctive auditory- and visual features to its corresponding word.

The child learns to link visual representations of objects to their corresponding words.

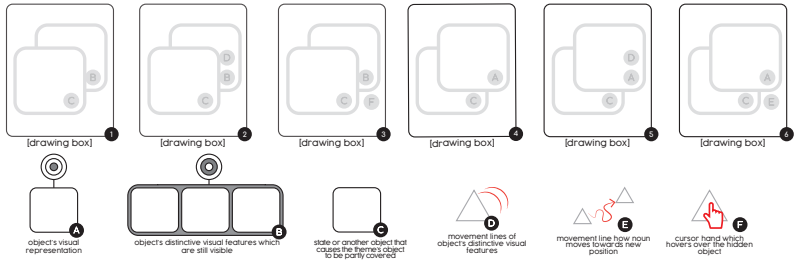
The child learns which auditory- and visual features are essential for recognizing a specific object

Template's storyline: Kiki is looking for somebody/something within the scene. However, she can't seem to find it, although the person or thing that she is looking for is partly hidden within the scenery (ex. bee hidden behind the bush). The person or thing she is looking for is the episode's central theme (ex. what is a bee). The object in question is covered in a way that only its distinctive visual features are visible (ex. wings, yellow and black stripes body, angle, antennas).

Kiki asks the viewer if they can find the person or thing she is looking for. The viewer gets some time to point towards the partly covered object. After that time has passed, a cursor will appear on the screen and points to the hidden object. After clicking on it, the object reveals itself. Kiki links the object's visual representation to its corresponding word. And she thanks the viewer for helping her.

Story brainstorm questions:
- In what relatable setting or situation would Kiki want to find this object?

Story brainstorm questions:
- How can the suddenly appeared object help Kiki further in this story?
- How could the object's action features be used in the story?



shot #	Introduce to the viewer what object the character is looking for	Let the viewer feel that they need to answer character's question	Attract viewer's attention towards to the mystery object in question	By recognizing the object's auditory-visual features, the viewer gives a response	The viewer gets a hint what kind of response is required from them (pointing), by seeing the curser moving toward the hidden object	Child voice-over gives cue what kind of response is required from viewer	Revealing the object by showing all its visual features	Linking the object's representation to its corresponding word	Integrate auditory-visual features in question to the whole object	Rewarding the viewer by letting them feel that their input was helpful
	[drawing box] 1	[drawing box] 1	[drawing box] 2	[drawing box] 1	[drawing box] 3	[drawing box] 3	[drawing box] 6	[drawing box] 4	[drawing box] 5	[drawing box] 4
	Where is [object]?	I can't find [object]. Can you show me where [object] is?	[sound that objectmakes, if applicable] [avatar object]	Ambient "waiting for response" music	Ambient "waiting for response" music	There.	Uplifting "appearance of answer" sound	Look there is [object]	[sound that object makes, if applicable] [avatar object]	Thank you for helping me find [object]

response template: hide-and-seek

Response type: pointing response

Suitable categories: animals, people, things

Using this template, the child will learn:

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Story brainstorm questions:
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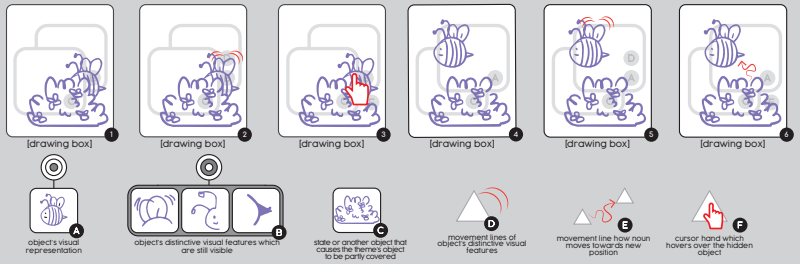

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	[drawing box] 1	[drawing box] 1	[drawing box] 2	[drawing box] 1	[drawing box] 3	[drawing box] 3	[drawing box] 6	[drawing box] 4	[drawing box] 5	[drawing box] 4
	Where is bee [object]?	I can't find bee [object]. Can you show me where bee [object] is?	Bzzzzzzz [sound that object makes, if applicable] [avatar object]	Ambient "waiting for response" music	Ambient "waiting for response" music	There.	Uplifting "appearance of answer" sound	Look there is bee [object]	Bzzzzzzz [sound that object makes, if applicable] [avatar object]	Thank you for helping me find bee [object]

response template: yes-or-no game

Story brainstorm questions:
• Why would Kiki be looking for this certain object? Does the object has some qualities which could help her on her quest within the story?

Response type: one-word response

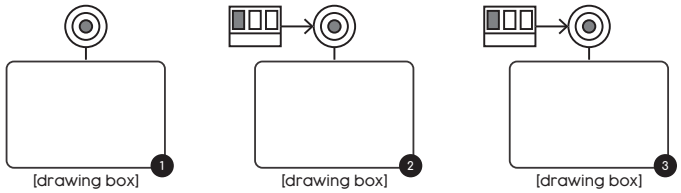
Suitable categories: animals, people, things, actions

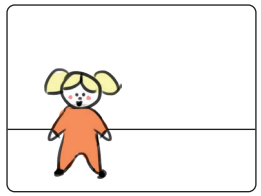
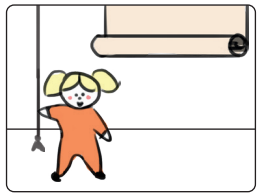
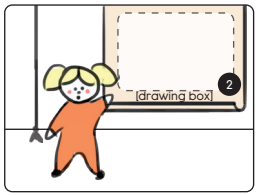
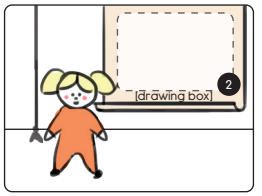
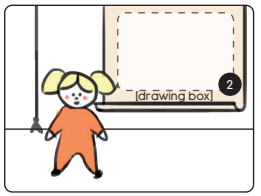
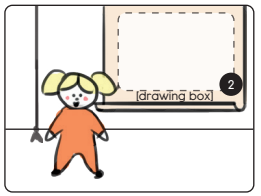
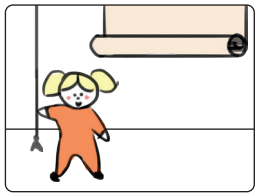
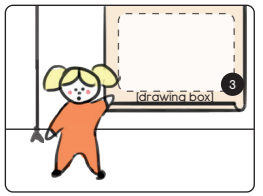
Using this template, the child will learn:
The child learns to link novel words to their visual represenations
The child learns to distinct words and their corresponding visual representations from other words
When an action or situation is used as input for this response moment, the child learns how (not) to behave in a certain situation (Ex. Is this how a bee flies?).

Template's storyline: Kiki is trying to remember how a particular person or thing looks like, so she needs some help from the viewer (ex. Do you know how a bee looks like?). She opens the map, which shows a visual representation of an object. The viewer needs to answer if the presented object on the map is the object Kiki is looking, by saying "yes" or "no".

Eventually, the correct object shows on the map at the 2nd or 3rd try, which changes each episode. By switching up the number of times it takes before the correct object shows the map, the show prevents that the child will answer on automatic pilot (ex. no-no-yes). If the child knows the second try could either be a "yes" or a "no", they know they need to actively think about if the presented object is the object that Kiki is looking for.

Alterations: This response moment can also be used for showing how somebody should behave in a certain way. For example, you could give three options for the question "Is this how a bee flies?". Two of them would be obviously wrong, which will lead to humorous moments within the series.



shot #	Introducing the character's problem to viewer	Let the viewer feel that they need to answer character's question	Attract viewer's attention on object in question presented on the map	By recognizing the presented object's visual features, the viewer gives a response	Correct answer is provided by child voice-over, which also hints what kind of response is expected from the viewer	Linking the object's representation to its corresponding word	Indicate that the next option is coming	By recognizing the presented object's visual features, the viewer gives a response	Optiona: Alter the number of options between episod
									
	I am looking for [object] But I forgot how looks like... [object]	Maybe the map can help me remember. Can you help me?	Is this [a(n) +object]?	Ambient "waiting for response" music	No!	Oh of course, this is [a(n) + other object from the same category]	Let's try it again!	Is this [a(n) +object]?	

response template: yes-or-no game

Story brainstorm questions:
• Why would Kiki be looking for this certain object? Does the object has some qualities which could help her on her quest within the story?

Response type: one-word response

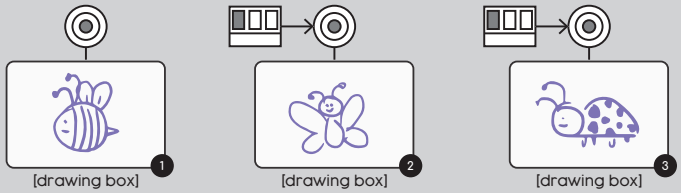
Suitable categories: animals, people, things, actions

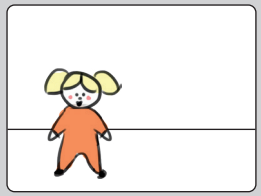
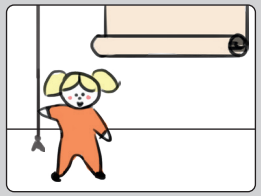
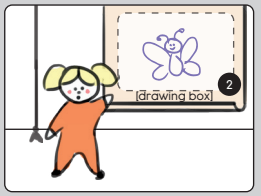
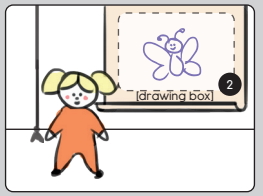
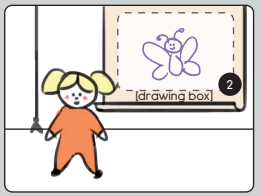
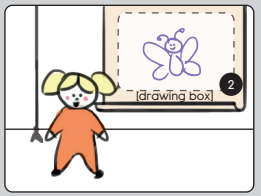
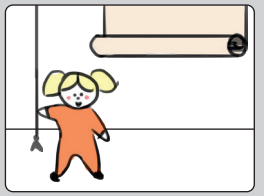
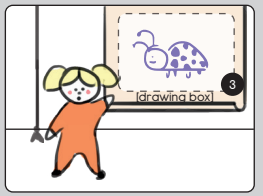
Using this template, the child will learn:
The child learns to link novel words to their visual represenations
The child learns to distinct words and their corresponding visual representations from other words
When an action or situation is used as input for this response moment, the child learns how (not) to behave in a certain situation (Ex. Is this how a bee flies?).

Template's storyline: Kiki is trying to remember how a particular person or thing looks like, so she needs some help from the viewer (ex. Do you know how a bee looks like?). She opens the map, which shows a visual representation of an object. The viewer needs to answer if the presented object on the map is the object Kiki is looking, by saying "yes" or "no".

Eventually, the correct object shows on the map at the 2nd or 3rd try, which changes each episode. By switching up the number of times it takes before the correct object shows the map, the show prevents that the child will answer on automatic pilot (ex. no-no-yes). If the child knows the second try could either be a "yes" or a "no", they know they need to actively think about if the presented object is the object that Kiki is looking for.

Alterations: This response moment can also be used for showing how somebody should behave in a certain way. For example, you could give three options for the question "Is this how a bee flies?". Two of them would be obviously wrong, which will lead to humorous moments within the series.

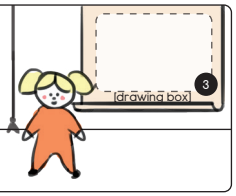
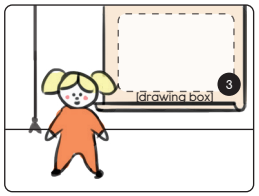
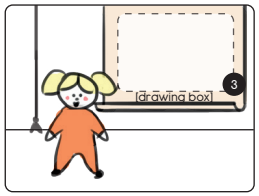
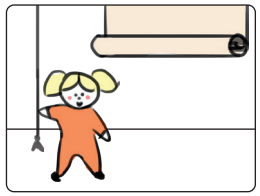
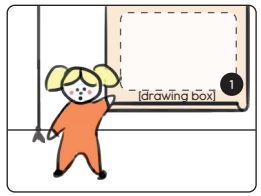
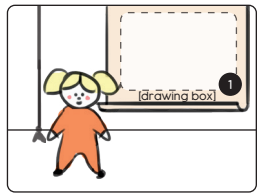
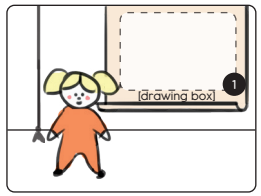
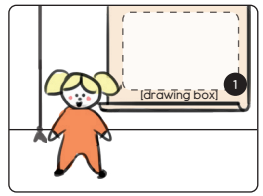


shot #	Introducing the character's problem to viewer	Let the viewer feel that they need to answer character's question	Attract viewer's attention on object in question presented on the map	By recognizing the presented object's visual features, the viewer gives a response	Correct answer is provided by child voice-over, which also hints what kind of response is expected from the viewer	Linking the object's representation to its corresponding word	Indicate that the next option is coming	By recognizing the presented object's visual features, the viewer gives a response	Optiona: Alter the number of options between episod
									
	I am looking for bee [object] But I forgot how looks like... bee [object]	Maybe the map can help me remember. Can you help me?	Is this a bee [a(n) +object]?	Ambient "waiting for response" music	No!	Oh of course, this is a butterfly [a(n) + other object from the same category]	Let's try it again!	Is this a bee [a(n) +object]?	

see backside for example

Story brainstorm questions:
- What is Kiki going to do with this obtained information?
- How could the object's action features be used in the story?

es to prevent an autmatic set of reply

By recognizing the presented object's visual features, the viewer gives a response	Correct answer is provided by child voice-over, which also hints what kind of response is expected from the viewer	Linking the object's representation to its corresponding word	Indicate that the next option is coming	By recognizing the presented object's visual features, the viewer gives a response	By recognizing the presented object's visual features, the viewer gives a response	Correct answer is provided by child voice-over, which also hints what kind of response is expected from the viewer	shot # Linking the object's representation to its corresponding word.
							
Ambient "waiting for response" music	No!	Oh of course, this is [a(n) + other object from the same category]	Let's try it again!	Is this [a(n) +object] ?	Ambient "waiting for response" music	Yes!	Yes now I remember, This is [a(n) + object] Thank you for helping!

see backside for it yourself

Story brainstorm questions:
- What is Kiki going to do with this obtained information?
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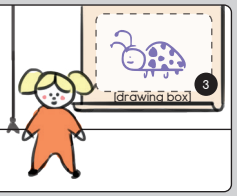
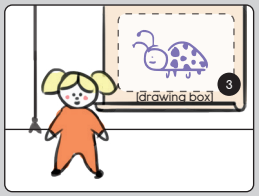
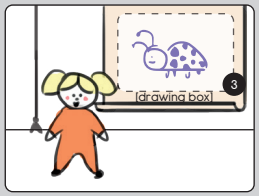
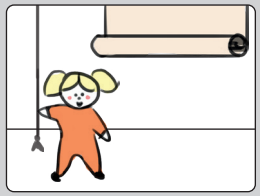
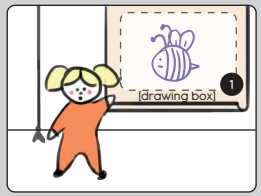
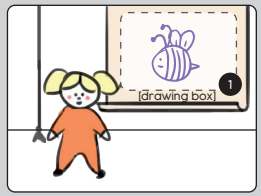
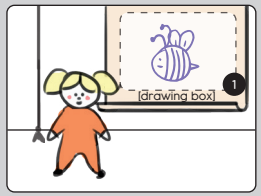
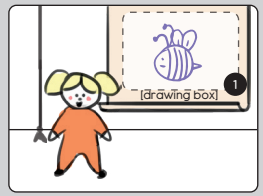
							
Ambient "waiting for response" music	No!	Oh of course, this is a ladybug [a(n) + other object from the same category]	Let's try it again!	Is this a bee [a(n) +object] ?	Ambient "waiting for response" music	Yes!	Yes now I remember, This is a bee [a(n) + object] Thank you for helping!

response template: the helping hand

Story brainstorm questions:
- In what relatable setting or situation could Kiki encounter this mystery object?

Response type: Imitation by using fine motor skills

Suitable categories: animals, people, things, actions

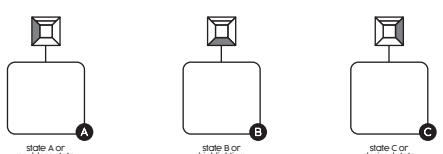
Using this template, the child will learn:

The child actively learns the meaning of verbs (Ex. what does "washing" mean?):
- How an action visually looks like
- What kind of effect the action has on an object
- Why you want to perform this action in specific situations

The child actively learns what kind of actions specifically belong to certain objects (Ex. What does a bee typically do? A bee flies in the air)

The child improves their fine motor skills by copying the movements

Template's storyline: The co-character in the story has a problem which needs to be solved (ex. the car is dirty). But there are no worries, since Kiki suggests an action as a solution which helps to overcome the co-characters problem (ex. if you wash the car, then the car becomes clean). The viewer needs to participate within the action by copying the movements from Kiki. If the viewer accompanies the movements of Kiki, the problem is solved in a better way (ex. the car is cleaned faster).



shot #	Character makes problem state clear to the viewer	Introduce an action as solution to reach desired state	Make clear to the viewer how their participation could improve the current situation	Put character in the right position so the viewer more able to focus on her movements			Explain steps and tools needed to execute action (optional)		
	[drawing box] f A	[drawing box] a A	[drawing box] h A	[drawing box] h A	[drawing box] h A	[drawing box] h A	[drawing box] a A	[drawing box] b A	
	Oh no, [state A/state C/tools&circumstances]	Don't worry, if we [action] Then [state C]	If we help [name co-character + action] we can [state C] I will show you how it's done.	Okay let's move a little closer so you can see me better!	"Character moving closer" sound	So that's better. Let's help [name co-character + action]	First, [micro-action]	Then, [micro-action]	...and [micro

response template: the helping hand

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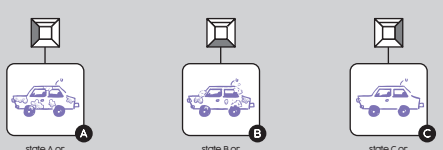
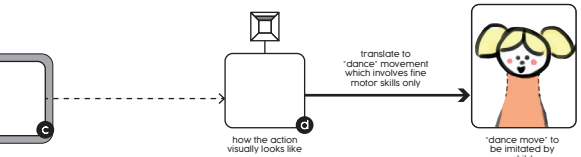
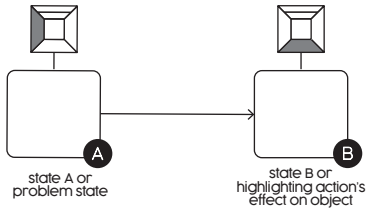
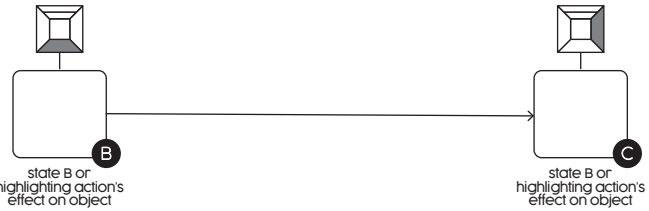
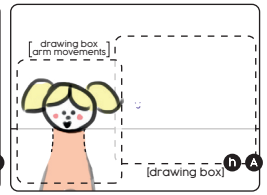
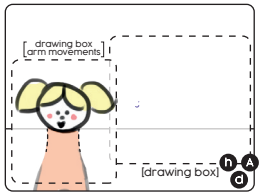
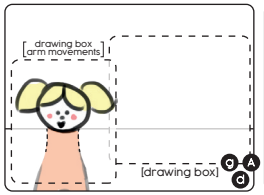
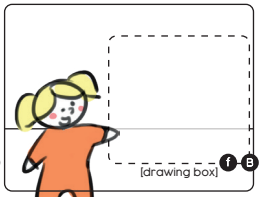
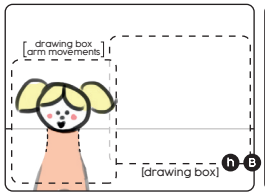
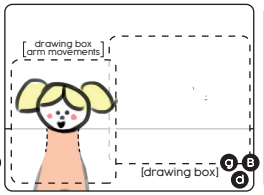
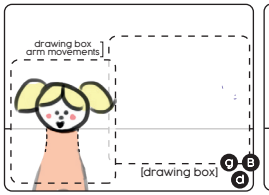
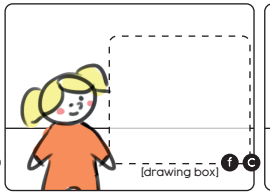


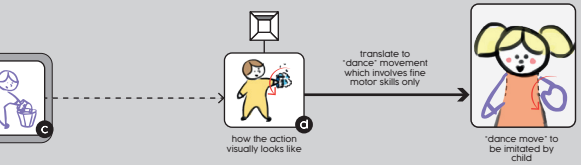
shot #	Character makes problem state clear to the viewer	Introduce an action as solution to reach the desired state	Make clear to the viewer how their participation could improve the current situation	Put the main character in the right position so the viewer is more able to focus on her movements			Explain steps and tools needed to execute action (optional)		
	[drawing box] f A	[drawing box] a A	[drawing box] h A	[drawing box] h A	[drawing box] h A	[drawing box] h A	[drawing box] a A	[drawing box] b A	
	Oh no, the car is dirty [state A/tools&circumstances/state C] [avatar co-character]	Don't worry, if we wash the car [action] Then the car will be clean again [state C]	If we help Harry wash the car [name co-character + action] we can get the car clean faster [state C] I will show you how it's done.	Okay let's move a little closer so you can see me better!	"Character moving closer" sound	So that's better. Let's help Harry wash the car [name co-character + action]	First, you take a bucket of water [micro-action]	Then, you take a brush [micro-action]	...and you put the bru [micro

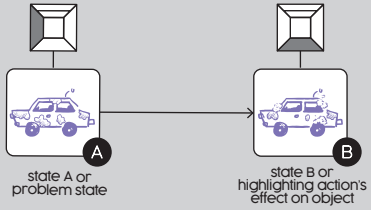


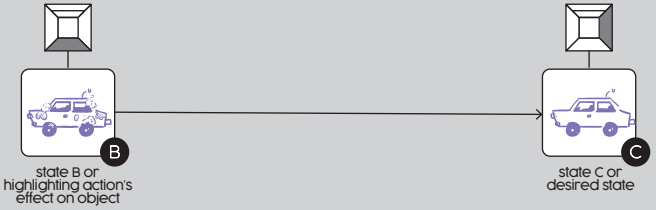


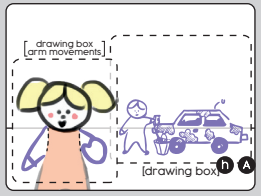
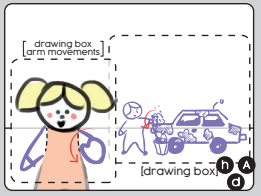
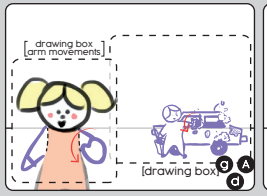
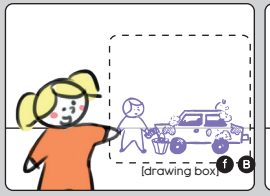
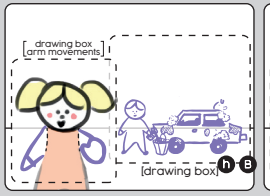
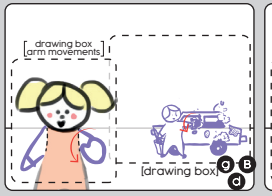
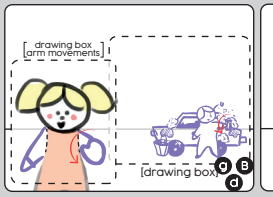
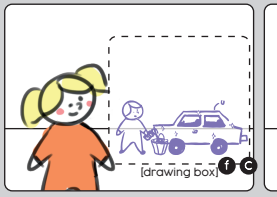


	Show the viewer the move to copy that corresponds the movement of action	Signal to actively participate & showing progress of active participation	Viewer copies move & sees how their movement makes impact on object in the background	Adressing the effect of doing the action on object	Signal to the viewer that he needs to actively copy the move again	Viewer copies move & sees how their movement makes impact on object in the background		Attract viewer's attention on state change object	
									
d then -action]	(Then) you [action] like this.	[verb as a rhytmic song]	[verb as a rhytmic song]	Look, [state B]	Let's [action] some more! Let's go!	[verb as a rhytmic song]	[verb as a rhytmic song]	Uplifting "desired state is reached" sound	







	Show the viewer the move to copy that corresponds to the movement of action	Signal to actively participate & showing the progress of viewer's active participation	Viewer copies move & sees how their movement makes impact on object in the background	Adressing the action's effect on the object	Signal to the viewer that he needs to actively copy the move again	Viewer copies move & sees how their movement makes impact on object in the background		Attract viewer's attention on object's state change	
									
d then sh in the water -action]	(Then) you wash the car [action] like this.	wash, wash, wash, wash! [verb as a rhytmic song]	wash, wash, wash, wash! [verb as a rhytmic song]	Look, the stains disappear [state B]	Let's wash the car [action] some more! Let's go!	wash, wash, wash, wash! [verb as a rhytmic song]	wash, wash, wash, wash! [verb as a rhytmic song]	Uplifting "desired state is reached" sound	

see backside for example

co-character

- e: co-character's eye gaze is focused on Kiki
- f: co-character's eye gaze is focused on object's current state
- g: co-character's eye gaze is focused on executing the action
- h: co-character's eye gaze is focused on the viewer

Story brainstorm questions:
- How can the suddenly appeared object help Kiki further in this story?
- How could the object's action features be used in the story?

...n on ...	Moving character closer to object to let the viewer see the object up close	Address how the action changed the object into the desired state		shot # Rewarding the viewer by letting them feel that their input was helpful
...ox] f c	[drawing box] f c	[drawing box] f c	[drawing box] e c	[drawing box] h c
...ate ...d	"Character moving back" sound	Wauw, [state C]	Yes, [action] together went really well!	Thank you for helping us [action]; Without you, we couldn't get [state C]

see backside to try it yourself

co-character

- e: co-character's eye gaze is focused on Kiki
- f: co-character's eye gaze is focused on object's current state
- g: co-character's eye gaze is focused on executing the action
- h: co-character's eye gaze is focused on the viewer

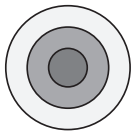
Story brainstorm questions:
- How can the suddenly appeared object help Kiki further in this story?
- How could the object's action features be used in the story?

...on	Moving character closer to object to let the viewer see the object's state up close	Address how the action changed the object's state into the desired state		shot # Rewarding the viewer by letting them feel that their input was helpful
...ox] f c	[drawing box] f c	[drawing box] f c	[drawing box] e c	[drawing box] h c
...ate ...d	"Character moving back" sound	Wauw, the car is really clean! [state C]	Yes, washing the car [action] together went really well!	Thank you for helping us washing the car [action]; Without you, we couldn't get the car this clean [state C]

D.1 Evaluation survey episode builder

name:

The following questions will go about **brainstorm tool: object circle** when exploring the central theme's features.



Q1.1The way how the template should be used was very clear

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q1.2 When using this template it is clear for me how this step contributes to the creation of educational videos for 1.5-3-year-olds

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q1.3 What do you think about the time it took to explore features with this template?

Too short ☐ ☐ ☐ ☐ ☐ ☐ ☐ Too long

just right

Q1.4 To what extend are you content with the way how you are structurally supported when exploring the central theme's features by using this template?

Not content at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very content

Q1.5 When using this template to explore the central theme's features, I have the feeling that I have the freedom to come up with a lot of different ideas.

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q1.6 When using this template to explore the central theme's features, I have the feeling that I can give my own twist to the outcome of this template.

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

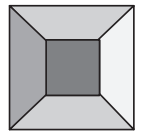
Q1.7 The outcome of the template was something surprising to me

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q1.8 To what extend are you content with the way how you could creatively express yourself through this template when exploring the central theme's features?

Not content at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very content

The following questions will go about **brainstorm tool: action square** when exploring the central theme's features.



Q2.1The way how the template should be used was very clear

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q2.2 When using this template it is clear for me how this step contributes to the creation of educational videos for 1.5-3-year-olds

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q2.3 What do you think about the time it took to explore features with this template?

Too short ☐ ☐ ☐ ☐ ☐ ☐ ☐ Too long

just right

Q2.4 To what extend are you content with the way how you are structurally supported when exploring the central theme's features by using this template?

Not content at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very content

Q2.5 When using this template to explore the central theme's features, I have the feeling that I have the freedom to come up with a lot of different ideas.

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q2.6 When using this template to explore the central theme's features, I have the feeling that I can give my own twist to the outcome of this template.

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

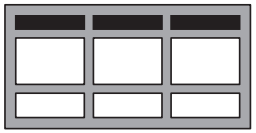
Q2.7 The outcome of the template was something surprising to me

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q2.8 To what extend are you content with the way how you could creatively express yourself through this template when exploring the central theme's features?

Not content at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very content

The following questions will go about the **response templates** when creating a response moment for in the episode.



Q3.1The way how the template should be used was very clear

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q3.2 When using this template it is clear for me how this step contributes to the creation of educational videos for 1.5-3-year-olds

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q3.3 What do you think about the time it took to explore features with this template?

Too short ☐ ☐ ☐ ☐ ☐ ☐ ☐ Too long

just right

Q3.4 To what extend are you content with the way how you are structurally supported when exploring the central theme's features by using this template?

Not content at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very content

Q3.5 When using this template to explore the central theme's features, I have the feeling that I have the freedom to come up with a lot of different ideas.

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q3.6 When using this template to explore the central theme's features, I have the feeling that I can give my own twist to the outcome of this template.

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

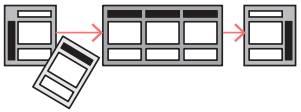
Q3.7 The outcome of the template was something surprising to me

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q3.8 To what extend are you content with the way how you could creatively express yourself through this template when exploring the central theme's features?

Not content at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very content

The following questions will go about the **story templates and shot card** when adding a story element around the response moment.



Q4.1The way how the template should be used was very clear

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q4.2 When using this template it is clear for me how this step contributes to the creation of educational videos for 1.5-3-year-olds

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q4.3 What do you think about the time it took to add a story element with this template?

Too short ☐ ☐ ☐ ☐ ☐ ☐ ☐ Too long

just right

Q4.4 To what extend are you content with the way how you are structurally supported when adding a story element by using this template?

Not content at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very content

Q4.5 When using this template to add a story element, I have the feeling that I have the freedom to come up with a lot of different ideas.

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q4.6 When using this template to create a story element, I have the feeling that I can give my own twist to the outcome of this template.

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q4.7 The outcome of the template was something surprising to me

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q4.8 To what extend are you content with the way how you could creatively express yourself through this template when adding a story element?

Not content at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very content

the episode builder toolkit in general

The following questions will go about the **the episode builder toolkit and its outcome in general** when adding a story element around the response moment.

Q5.1The way how the templates should be used was very clear

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q5.2 It is for me clear how the episode builder overall contributes to the creation of educational videos for 1.5-3-year-olds

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q5.3 What do you think about the time the episode builder toolkit took to create a storyboard?

Too short ☐ ☐ ☐ ☐ ☐ ☐ ☐ Too long

just right

Q5.4 To what extend are you content with the way how you are structurally supported when creating a storyboard by using the episode builder toolkit?

Not content at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very content

Q5.5 When using the episode builder toolkit to create a storyboard, I have the feeling that I have the freedom to come up with a lot of different ideas.

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q5.6 When using the episode builder toolkit to create a storyboard, I have the feeling that I can give my own twist to the outcome of this storyboard.

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

Q5.7 The outcome of the storyboard was something surprising to me

Totally disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ Totally agree

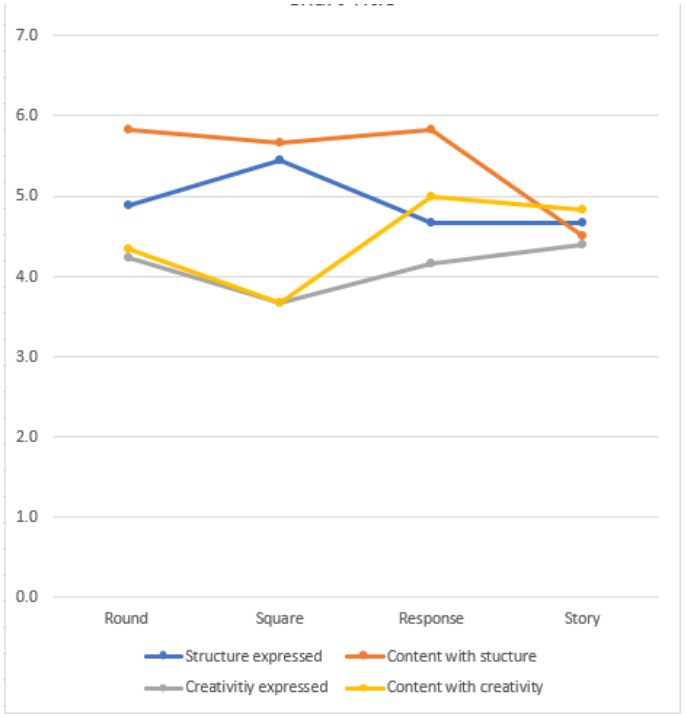
Q5.8 To what extend are you content with the way how you could creatively express yourself through the episode builder toolkit to create a storyboard?

Not content at all ☐ ☐ ☐ ☐ ☐ ☐ ☐ Very content

D.2 Results evaluation survey episode builder

		Kim	Martine	Karen	Paul	Lindsey	Dannique	
Brainstorm circle template	Q1.1	4	4	6	4	6	6	5.0
	Q1.2	5	6	6	3	5	7	5.3
	Q1.3	5	5	3	5	6	6	5.0
	Structure expressed	4.7	5.0	5.7	4.0	4.7	5.3	**4.9**
	Q1.4	6	5	5	7	6	6	**5.8**
	Q1.5	3	7	3	5	4	7	4.8
	Q1.6	5	7	2	2	3	5	4.0
	Q1.7	4	4	2	2	5	6	3.8
	Creativitiy expressed	4.0	6.0	2.3	3.0	4.0	6.0	**4.2**
	Q1.8	5	6	3	2	4	6	**4.3**
Brainstorm square template	Q2.1	7	6	6	3	5	6	5.5
	Q2.2	6	7	6	5	3	2	4.8
	Q2.3	5	4	4	4	5	5	4.5
	Structure expressed	6.0	6.7	6.3	5.0	4.3	4.3	**5.4**
	Q2.4	7	6	5	5	6	5	**5.7**
	Q2.5	3	5	3	1	2	5	3.2
	Q2.6	5	5	5	3	3	6	4.5
	Q2.7	4	3	2	3	5	3	3.3
	Creativitiy expressed	4.0	4.3	3.3	2.3	3.3	4.7	**3.7**
	Q2.8	4	5	3	3	4	3	**3.7**
Response template	Q3.1	3	5	3	3	6	5	4.2
	Q3.2	6	7	5	5	7	7	6.2
	Q3.3	5	6	7	5	5	6	5.7
	Structure expressed	4.666667	5	3	4.333333	6	5	**4.7**
	Q3.4	5	6	5	6	7	6	**5.8**
	Q3.5	6	6	2	2	5	2	3.8
	Q3.6	5	6	2	3	6	5	4.5
	Q3.7	5	3	3	2	7	5	4.2
	Creativitiy expressed	5.333333	5	2.333333	2.333333	6	4	**4.2**
	Q3.8	6	7	5	2	6	4	**5.0**

Story template	Q4.1	5	4	3	3	5	5	4.2
	Q4.2	6	5	5	3	6	6	5.2
	Q4.3	6	4	6		5	4	5.0
	Structure expressed	4.666667	5.333333	3.666667	3	5.333333	6	**4.7**
	Q4.4	5	6	4	6	3	3	**4.5**
	Q4.5	6	7	2	3	5	6	4.8
	Q4.6	7	5	2	3	5	5	4.5
	Q4.7	4	4	3	2	4	6	3.8
	Creativitiy expressed	5.666667	5.333333	2.333333	2.666667	4.666667	5.666667	**4.4**
	Q4.8	6	7	4	3	5	4	**4.8**
Overall	Q5.1	4	4	3	4	5	4	4.0
	Q5.2	6	7	6	7	6	7	6.5
	Q5.3	5	6	4	5	6	6	5.3
	Structure expressed	5	4.666667	5.333333	5.333333	4.666667	4.666667	4.9
	Q5.4	6	6	6	6	6	6	6.0
	Q5.5	5	7	4	2	4	6	4.7
	Q5.6	6	6	3	2	6	5	4.7
	Q5.7	5	4	4	2	7	7	4.8
	Creativitiy expressed	5.333333	5.666667	3.666667	2	5.666667	6	4.7
	Q5.8	5	7	3	2	5	6	4.7



D.3 Results duration of the episode builder process & its 4-hour time predictions

Observations from tests	Chosen response template	Amount of shots	Extra time response moment	Time spend on brainstom circle (min)	Time spend on action square (min)	Time spend on response template (min)	Time spend on story template (min)	Total time spend on episode builder (min)	Total time spend on determining what to learn to the child (min)	Total time creating storyboard (min)	Total shots completed	From which already were filled in by template	Extra shots made but not used	Half filled-in shots	Total shot	Amount of time to create 1 shot on average (min)	Length storyboard in time (sec)
Group 1	Helping hand		4	26	15	38	12	91	41	50	11	0	0	11	22	2.3	92
Group 2	Hide-and-seek		2	8	15	40	13	76	23	53	13	0	4	1	18	2.9	58
Group 3	Yes-or-No game		2	20	16	34	4	74	36	38	23	3	0	0	20	1.9	62
Average				18	15	37	10	80	33	47						2.4	70.7

How much time spend on creating storyboard	amount of shots per storyboard (3 min & 4 sec/shot)	Max amount of shots per storyboard (5 min & 3sec/shot)	Average amount of shots per storyboard	Average time (min)	Average time (h)
	45	100	73	172	2.9
min time (sv * lds)	86	190			
max time (lv * ds)	133	294			
min time in hours	1.4	3.2			
max time in hours	2.2	4.9			

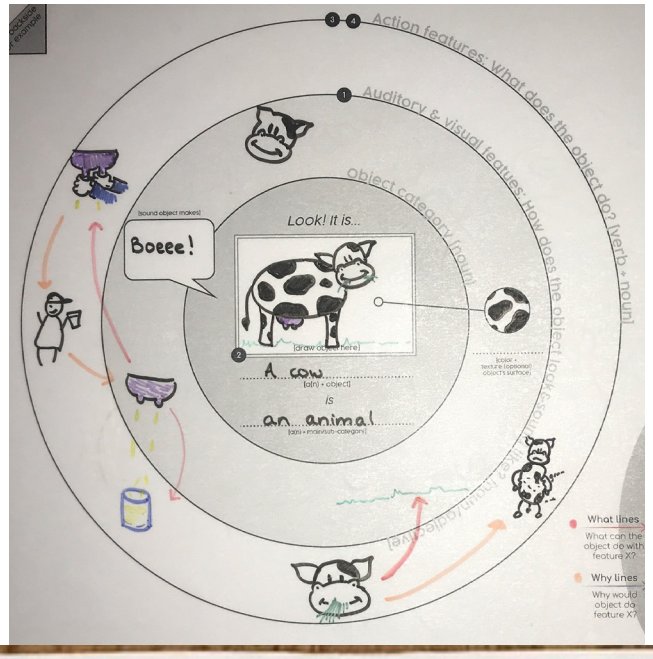
How much time is expected to create one storyboard	Time explore central themes featuers (brainstomr circle) in min	Time to explore possible story lines (action square x 3) in min	Time to create storyboard in min	Total expected time process in min	Total expected time process in hours
Minimum	20	15	86	121	2.016666667
Maximum	20	15	190	225	3.75
Average	20	15	172	207	3.45

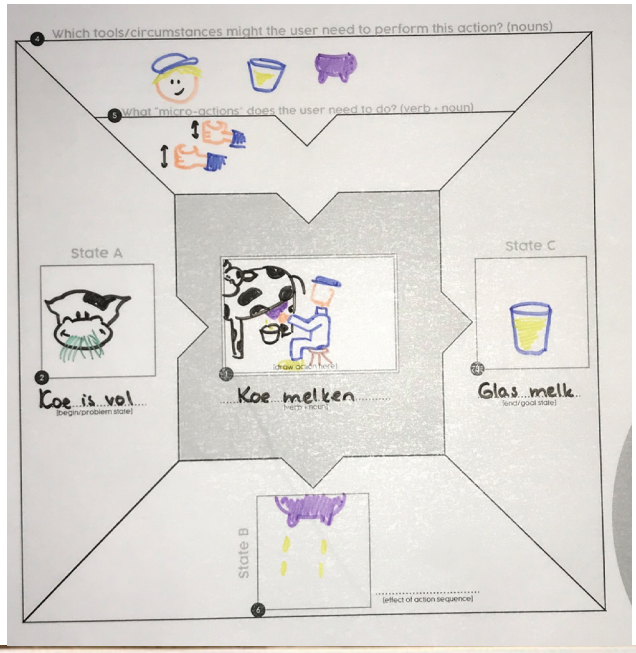
TYPE OF VIDEOS		
	Minutes	**Seconds**
Short video (sv)	3	180
Long video (lv)	5	300

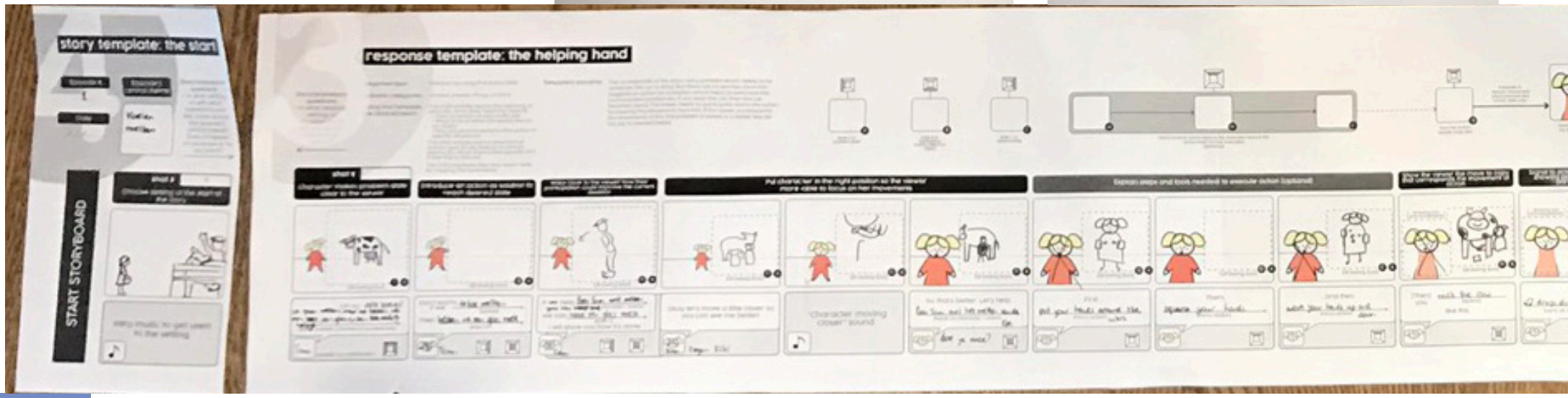
TYPE OF SHOTS	
Detailed shots (ds)	1 shot per 3 seconds
Less detailed shots (lds	1 shot per 4 seconds

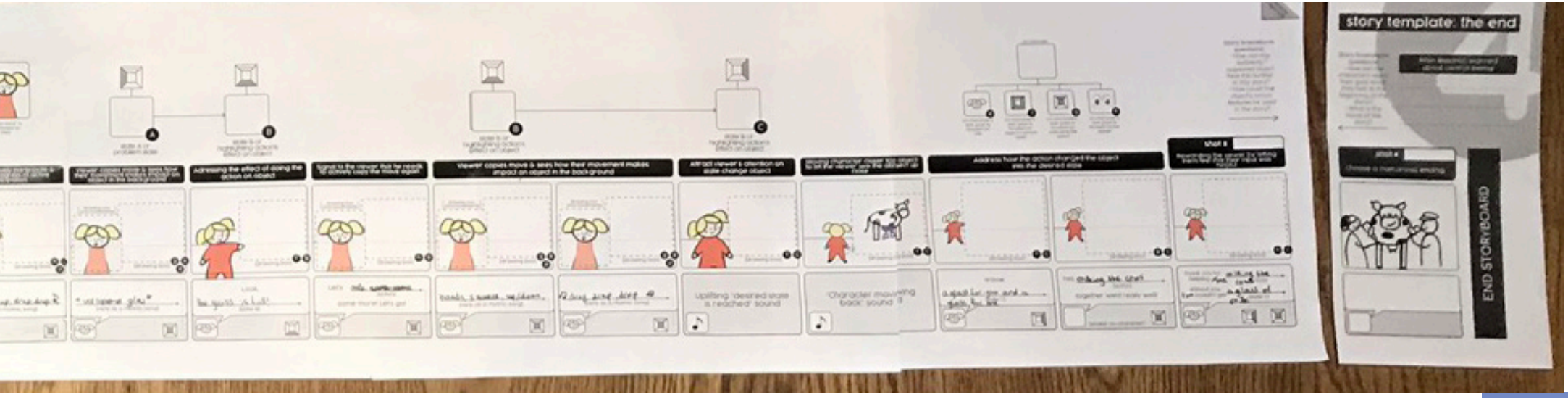
D.4 Results storyboards

GROUP 1: MLIKING THE COW

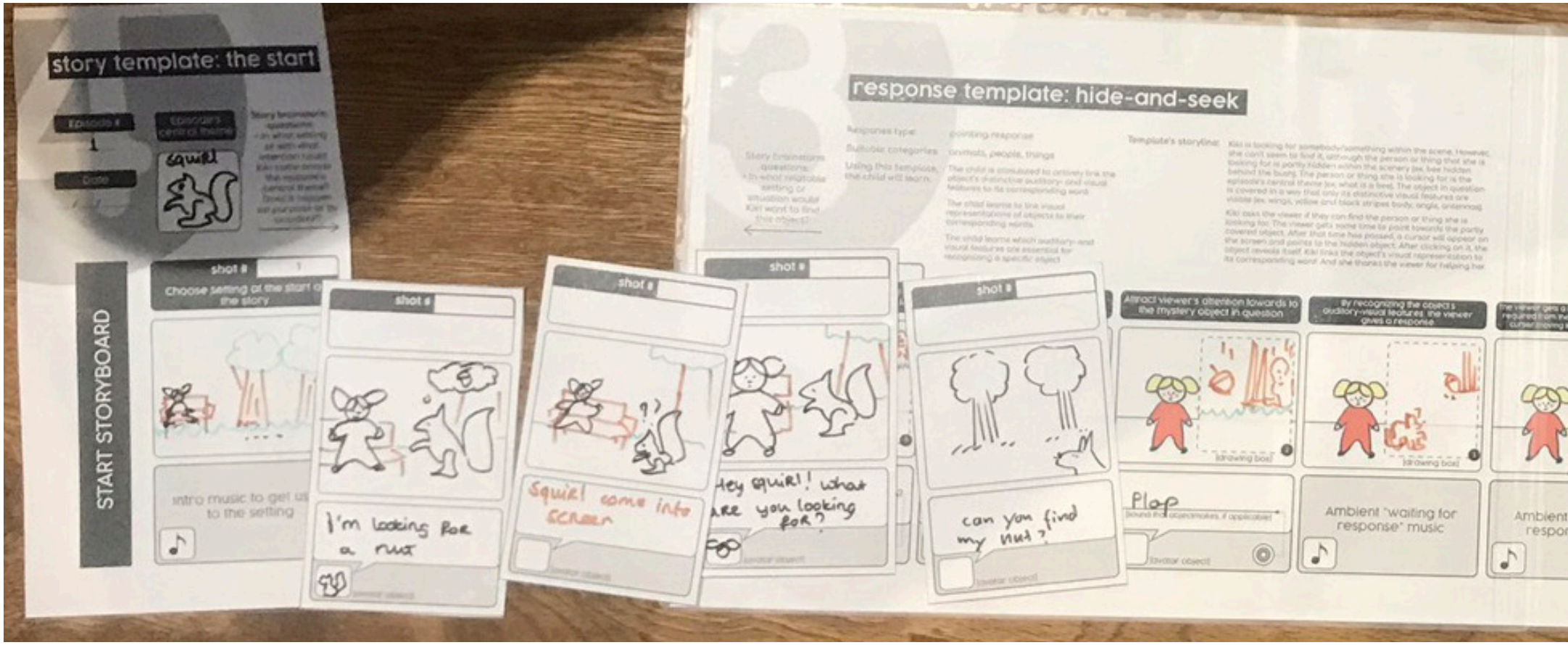


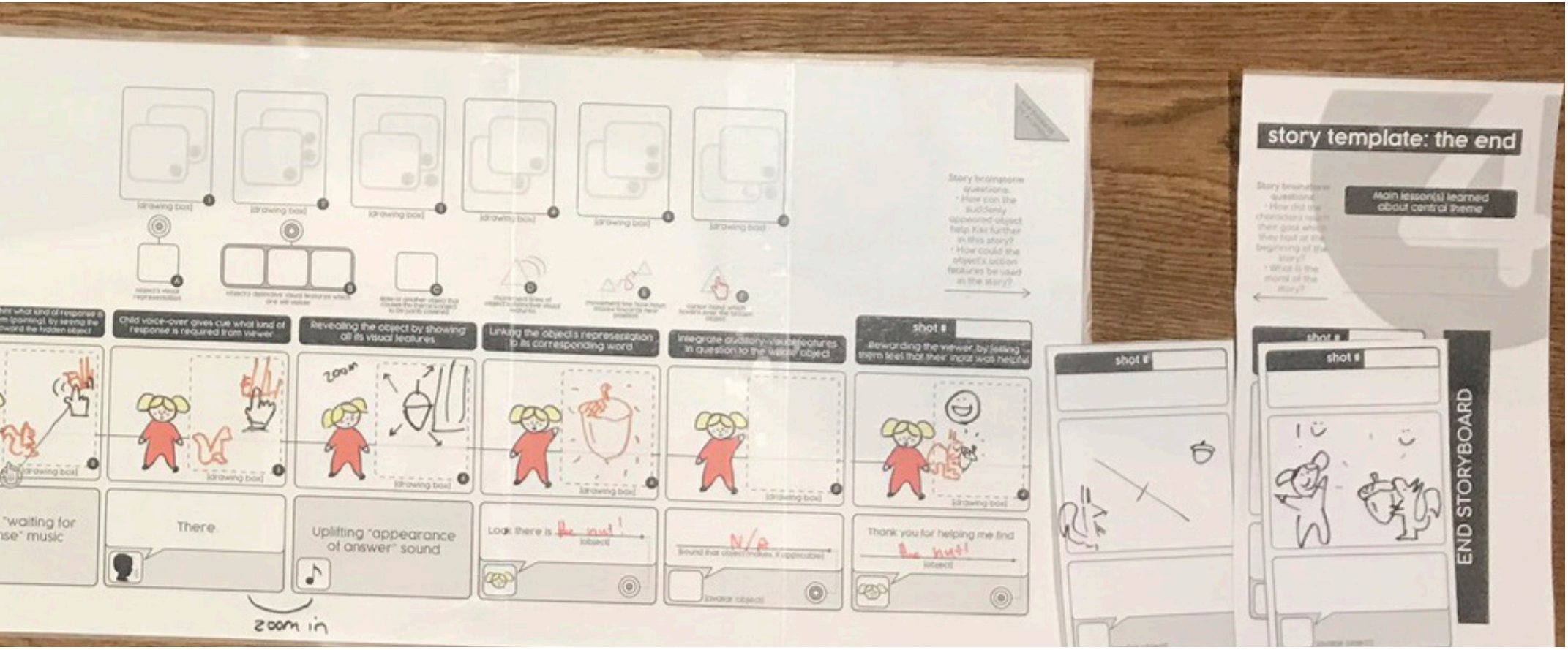




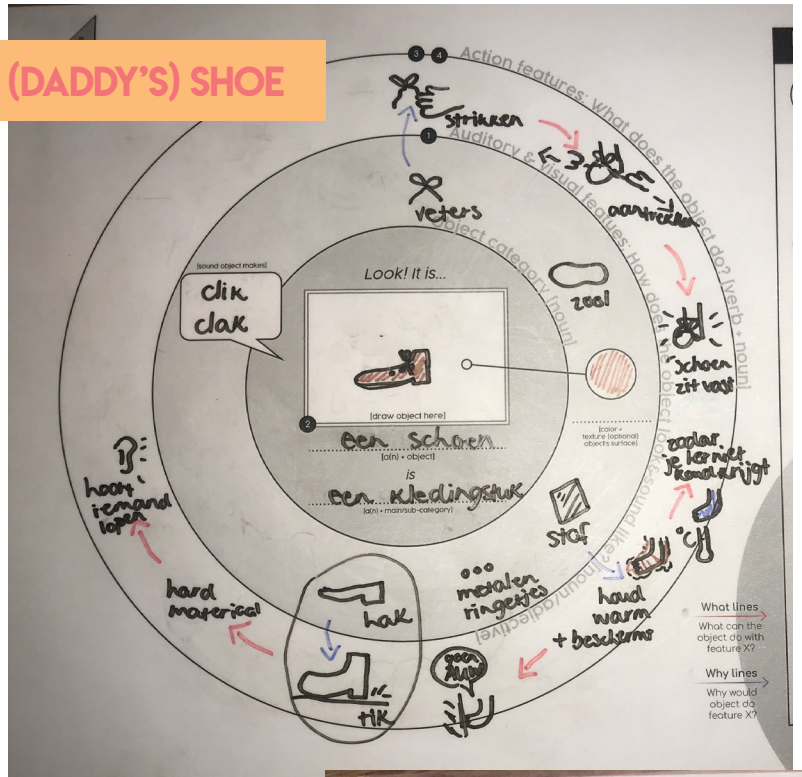

story template: the end
END STORYBOARD

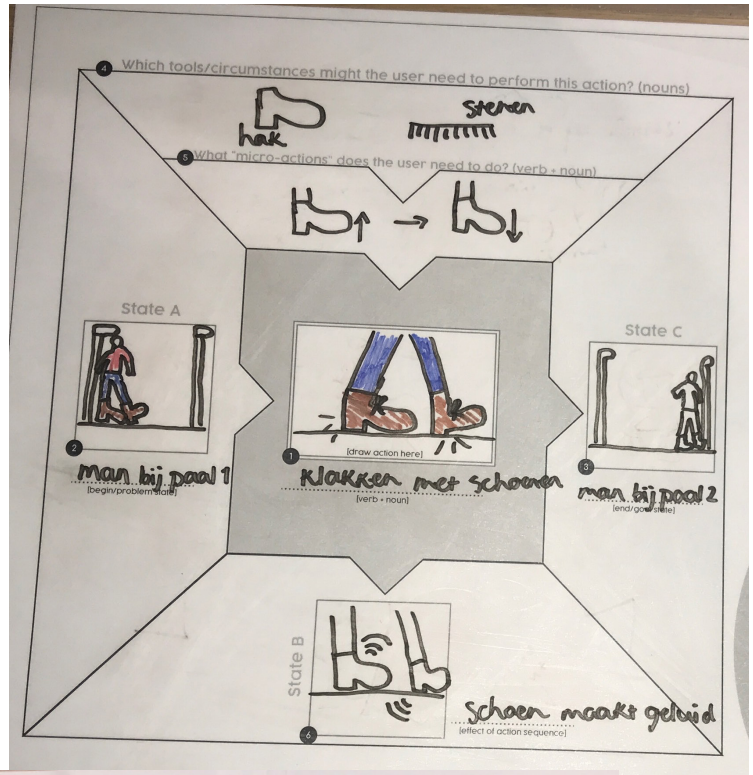
GROUP 2: A SQUIRL IS SEARCHING A NUT

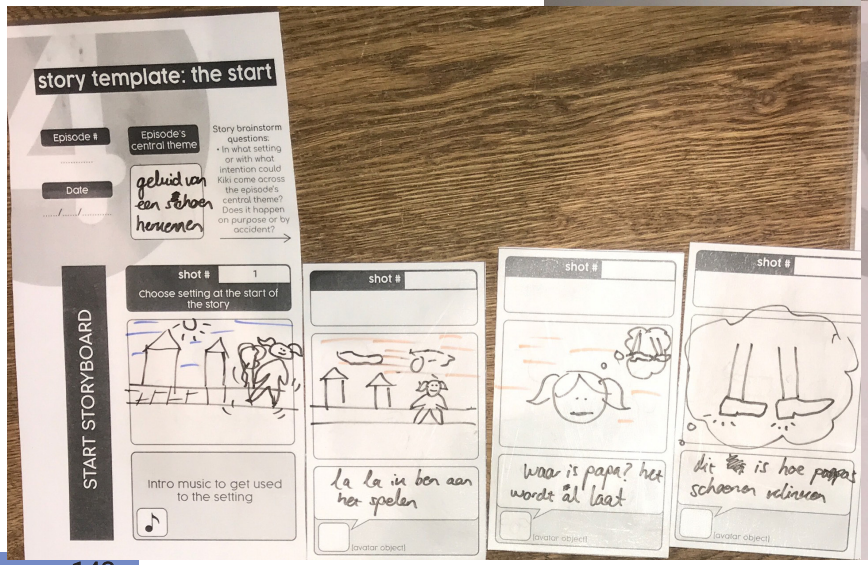


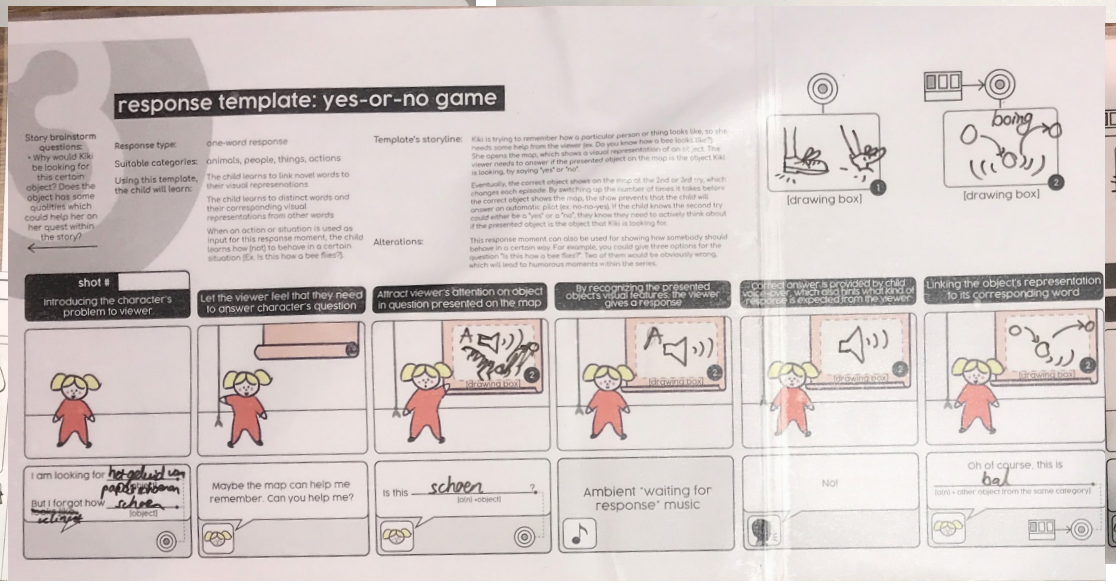

story template: the end
Main lesson(s) learned about central theme
Child voice-over gives cue what kind of response is required from viewer
Revealing the object by showing all its visual features
Linking the object's representation to its corresponding word
shot #
Rewarding the viewer by telling them feel that their input was helpful
There.
Uplifting "appearance of answer" sound
Look there is the nut!
N/A
Thank you for helping me find the nut!
zoom
zoom in
END STORYBOARD

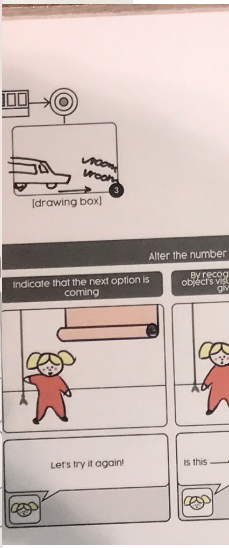
GROUP 3: THE TICKING OF (DADDY'S) SHOE

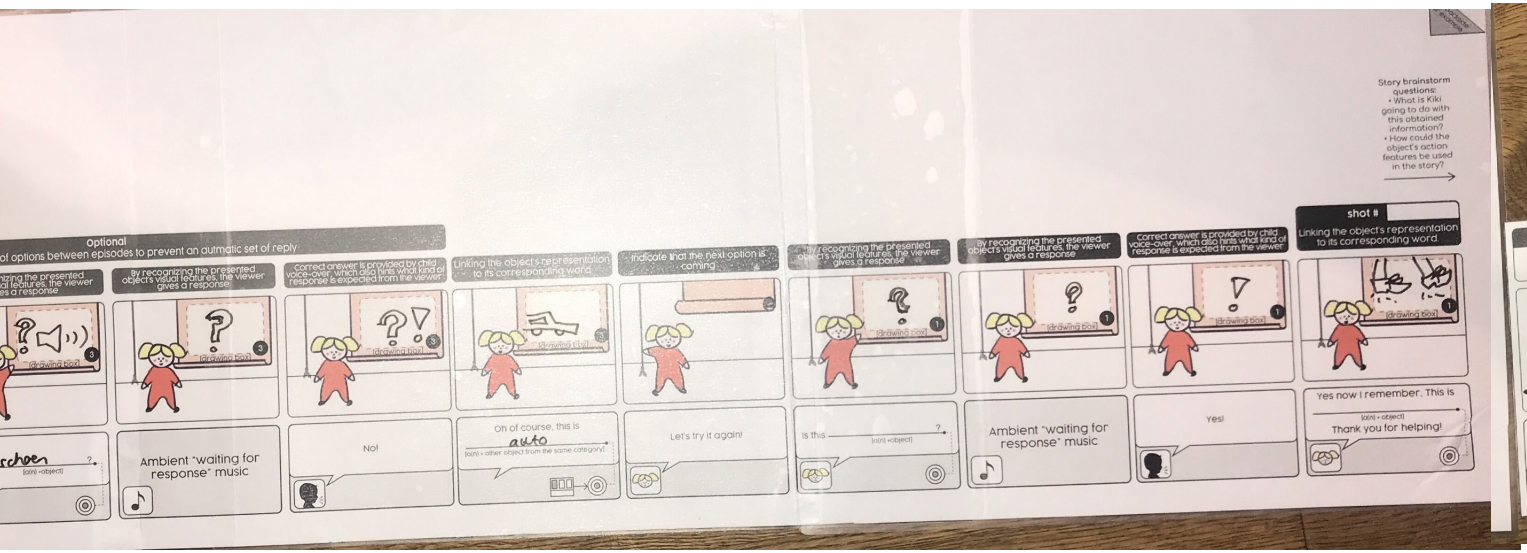


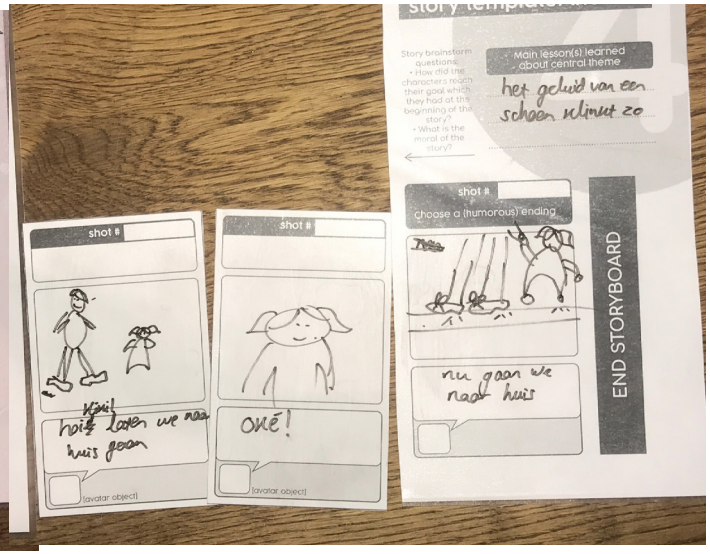









Story brainstorm questions:
• What is Kiki going to do with this obtained information?
• How could the object's action features be used in the story?
optional
of options between episodes to prevent an automatic set of reply
By recognizing the presented object's visual features, the viewer gives a response
Correct answer is provided by child voice-over, which also hints what kind of response is expected from the viewer
Linking the object's representation to its corresponding word
indicate that the next option is coming
By recognizing the presented object's visual features, the viewer gives a response
By recognizing the presented object's visual features, the viewer gives a response
Correct answer is provided by child voice-over, which also hints what kind of response is expected from the viewer
shot #
Linking the object's representation to its corresponding word
[drawing tool]
schoen
[kiki • object]
Ambient "waiting for response" music
No!
Oh of course, this is
auto
[kiki • other object from the same category]
Let's try it again!
Is this
[kiki • object]
Ambient "waiting for response" music
Yes!
Yes now I remember. This is
[kiki • object]
Thank you for helping!


shot #
[avatar object]
shot #
[avatar object]
Main lesson(s) learned about central theme
het geluid van een schoen klinkt zo
shot #
choose a (humorous) ending
nu gaan we naar huis
END STORYBOARD

Procedural Checks - IDE Master Graduation

TU Delft

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair Mathieu Gielen date 27 - 03 - 2020 signature Digitaal ondertekend door Mathieu Gielen Datum: 2020.03.27 13:33:34 +01'00'

CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair.
The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: 35 EC

Of which, taking the conditional requirements into account, can be part of the exam programme 30 EC

List of electives obtained before the third semester without approval of the BoE

★ YES all 1st year master courses passed

NO missing 1st year master courses are:

name Colinda van der Bunt date 30 - 03 - 2020 signature

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief mark
Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: ★ APPROVED NOT APPROV

Procedure: ★ APPROVED NOT APPROV

- projectbrief has been submitted late

com

name Monique von Morgen date 14 - 04 - 2020 signature

E.1 Project brief

Initials & Name T.E. Franx 4037 Student number 4307658

Title of Project Designing an educational experience for toddlers by using animation

Designing an educational experience for toddlers by using animation

project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date 28 - 02 - 2020

07 - 08 - 2020 end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

Screen time among children has increased over the past decade. In the Netherlands, a toddler of 2 years old spends 100 minutes behind screens on average, mostly watching tv and playing educational apps. (Nikken, 2019) Parents have various reasons to let their child use these kinds of media; most of them are related to when they don't have time to give their child their full attention. For example, they want to distract the child, so they have time to do some household related tasks or to have some time for themselves.

Meanwhile, media use, especially among young children under two years old, has been under scrutiny over the past years. Watching television is supposedly a 'mindless' activity, which harms the child's development. This results in parents having mixed feelings when they put their child in front of a screen. When they do put their child in front of a screen, they make sure that the presented media is at least educational. However, researchers state that these media statements are not entirely accurate and that young children are quite active when they are watching television. Toddlers imitate the characters, sing along and dance, and answer questions during quasi-interactive moments within the series. This way, when developmentally appropriate educational content merges with entertainment content, children can benefit. (Anderson, 1998) It's still not clear to what extent screen media can benefit the child's development. For now, the overall conclusion is that real-life models (which involves play and adult-child interaction) are better teachers then mediated models (like tv). (Valkenburg&Piotrowski, 2017)

Pixifox Animation is a newly founded Dutch animation studio, that aims to establish itself as an independent, global, leading player within the 3D animation and entertainment industry, creating innovative and meaningful experiences around animations for families across the globe through streaming services, TV networks and theatres. Starting with animated stories for the 1-3 year-olds on YouTube as a launching platform, Pixifox Animation ultimately aims to offer content for broader audiences and expand to other domains (such as toys and games) based upon their series. There are a lot of successful children animations that 1-3-year-olds can watch online already. To gain a position on the market, Pixifox Animation wants to distinguish itself as a high-quality option. For instance, they could provide a meaningful and educational experience that fit the needs of the parents and toddlers in a way that has not been offered by competitors yet.

Currently, the series is still in its earliest development phase. Pixifox Animation wants to release 52 episodes of stories about a set of characters. Every week one episode will be released on YouTube, which is favourable for the YouTube algorithm and creates structure for children and parents. Every episode will contain at least one quasi-interactive moment, which will trigger a particular reaction from the child that will contribute to the child's development. Pixifox aims to make these series such a success, that parents will buy the associated toy line for their kids as well.

"Play well" research lab has just been founded within the faculty of Industrial Design of TU Delft. The core theme of this Delft Design Lab is children's flourishing in and through play. The lab explores and communicates the relation between the design of facilities for children's play and children's physical, mental and emotional flourishing. It researches and develops models, methods and techniques for designers to facilitate and stimulate flourishing in play, including opportunities for children to participate productively in the design of facilities for play. This graduation project with Pixifox animations will be one of the first projects that can be a showcase on how design for children's play can impact children's cognitive, social-emotional and/or physical development positively.

space available for images / figures on next page

introduction (continued): space for images

image / figure 1: What current educational screen media interactions by toddlers look like

image / figure 2: A representation of how parents rather see their children play with toys than with screen media

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

Problem 1: Pixifox Animation aims to create an enjoyable and educational experience by integrating at least one "quasi-interactive moment" within every episode. However, how this moment can be designed to reach these goals is still unknown. To find out, this project should address the following issues:
* In order to contribute to the child's development, the animation should meet the child's developmental needs in an entertaining way. However, we lack insights about what these developmental needs for 1,5 to 3-year-olds are. Which leads to unclarity about which product characteristics and (quasi-)interactions should be implemented within animation series to support the development of 1,5 to 3-year-olds.
* Eventually, the parents are in charge what their child is going to watch. A wide variety of "educational" television series for young children does already exist. So how can Pixifox Animation distinguish the educational experience around the animation for 1,5 to 3-year-olds from its competitors and how can this be communicated to the parents? Furthermore, parents might have concerns about the harmful effects an innovative series could have on their child. What experiences around animations are considered acceptable and safe by parents and which are not?
* As mentioned in the introduction, the educational value of series is limited compared to real-life models, especially when children are watching these series alone. How can we overcome these limitations and elevate the series' educational value by designing the series' content in a better way? And to what extent can we involve other parties, like including a parent or a toy?

Problem 2: Pixifox Animation wants to create 52 episodes around 3 minutes long, which all contain at least one educational quasi-interactive moment. However, if the insights acquired from Problem 1 are presented in an incorrect form, we risk that the Pixifox-staff might oversee what is important or they won't become inspired to create a wide variety of educational episodes. So how can we translate the acquired knowledge from Problem 1 into a more comprehensible and accessible form that the Pixifox-staff can use within their creative process?

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, ... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

Doing design research about how animation can trigger a quasi-interactive experience among toddlers which contributes to their development while meeting the parents' concerns. This will be translated into a design template that Pixifox Animation can use to create these quasi-interactive moments within their series. Finally, a vision and example will be provided about how their toy line could elevate the educational experience of this quasi-interactive moment.

From the design research, I expect the following outcomes: 1) A timeline about the child's age-specific needs and abilities (1-3y-old) for their cognitive-, social-emotional- and physical development. 2) Insights about the current daily lives of young Dutch families, which will serve as an accessible pilot group. Like, how they operate, their belief systems about parenthood and media use. 3) Insights about how the creative process of Pixifox Animation works and what practices for informing and inspiring the creation of quasi-interactive moments would fit this process.The outcomes of the design research will be translated into a design template. This template will visually represent what interactions between the child and the series should take place to create an "quasi-interactive moment" (QIM), and how this QIM contributes to the child's development. The template shows essential steps within the animation's storyline which achieve certain goals that are necessary for the learning process. For instance, it should be clear to the child what kind of behaviour is desired when watching the QIM, and how the child can get proper feedback. Involvement of additional actors that can contribute to this experience, like parents or toys, will be shown in the template as well. On a more detailed level, the template will give direction what visual-auditory attributes and what type of content fit the child's cognitive, social-emotional and physical needs. Pixifox Animation can use this template as visual support for creating new episodes while guaranteeing the educational quality. Along with the design template, several solution areas and a vision will be provided about how the toy line could elevate the educational experience of the animation series. A provisional design will serve as an example of how the series and the toy line can come together. This will form a base for future graduate students for further developing the toy line.

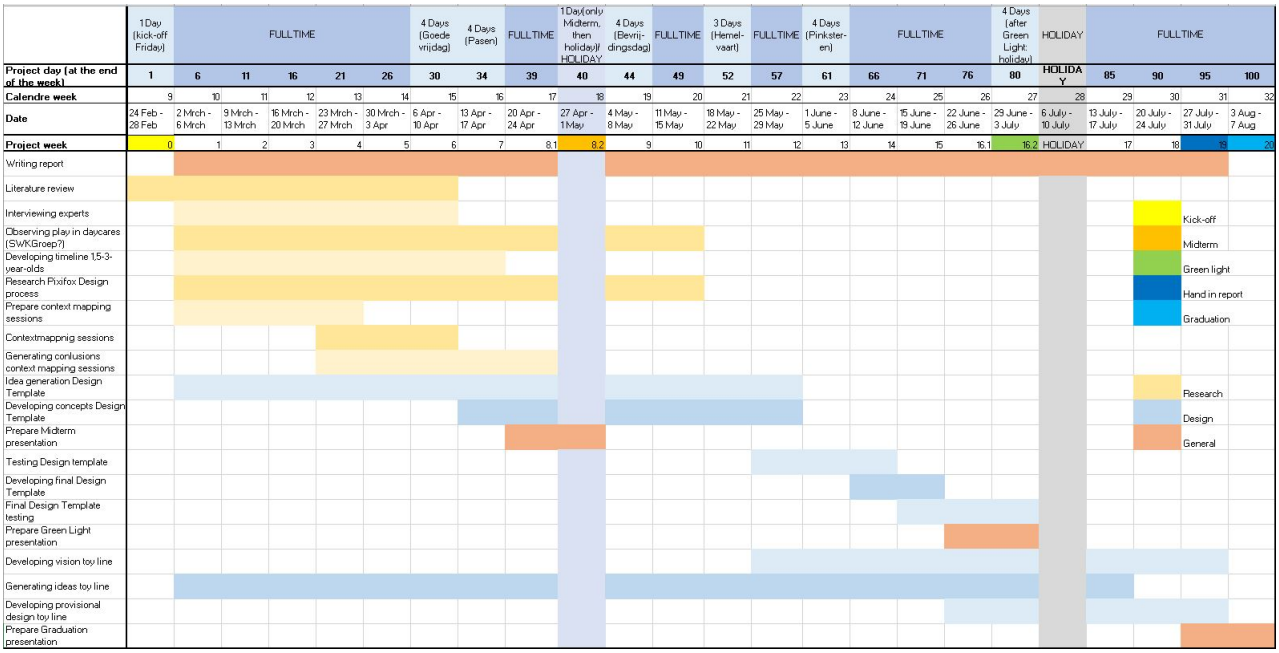
Initials & Name T.E. Franx Student number 4307658

Title of Project Designing an educational experience for toddlers by using animation

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date 28 - 2 - 2020 7 - 8 - 2020 end date



In the first half of my project, I will focus on design research, so I will have a good base for creating a design template.

After my midterm, I will be ideate about what the quasi-interactive moment could look like in more detail. Also, I will ideate and test ideas on how Pixifox can use this template in their creative process. Once the final template and the quasi-interactive moment are set, I can start exploring how a toy line can elevate this learning experience. A provisional design of a toy line and how it can work together with the interactive scene within the series will be developed in the last weeks of the project.

In general, I will work fulltime on my graduation project. However, there will be some exceptions:
* Due to some national holidays during this period, I work several days less in calendar week 15,16, 19, 21 & 23.
* After both my mid-term and green-light, I will take one week holiday in calendar week 18 and 28. To clarify the week of my mid-term where I also take a week holiday: I will hopefully plan my mid-term at the beginning of this week, so I can take the rest of the week off.

So I am only planning to work one day this week. In conclusion, I will spread the 100 days over 23 weeks. I plan to have my graduation ceremony in calendar week 32.

Initials & Name T.E. Franx Student number 4307658

Title of Project Designing an educational experience for toddlers by using animation

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, ... Stick to no more than five ambitions.

This project especially speaks to me, since I think there are a lot of opportunities to increase the educational value of animation series. I am looking forward to experimenting with different kinds of interactions that can stimulate play, and hopefully exploring new ways we can integrate play and electronic media. For this project, I want to achieve the following goals:

1. Producing something valuable for Pixifox which they can use in the future.

2. Delivering a concept that could be placed in my portfolio (if permitted?). This would be a nice addition but is not a necessity. I rather deliver something which is best for the development of the series than creating something that is rushed.

3. Create a rich understanding of the parents, the children and their context. It might be interesting to involve the Design for Emotion techniques during the context mapping sessions, especially the interview laddering technique. I already followed the Design for Emotion subject, and want to improve these skills.

4. If it's possible, conduct several tests with pilot episodes of the quasi-interactive moment among children. In an ideal case, Pixifox is able to create some test content at this stage. Otherwise, it might also be an idea to simulate some pilot episodes by myself, like creating some animation elements in power-point or simulate the story within a puppet show. Finally, it might also be interesting to see how a simple physical prototype of the toy line could stimulate interaction among children and could work together with the animation series. This can help validate some parts of the vision. But it is also nice to have a prototype as a showpiece at the graduation ceremony. However, this will have a lower priority than testing the content of the design template.

5. Improving my writing and representation skills. Reporting is my least favourite part of the design process, so I tend to neglect this process. However, I want to do this more consequent since it can help order my thoughts and communicate my insights to others as well.

References:

* Nikken, P. (2019). Iene Miene Media: Een review van het mediagebruik van kinderen tussen de 0 en 6 jaar in Nederland sinds 2012. Hilversum/Zwolle: Netwerk Mediawijsheid / hogeschool Windesheim.
* Valkenburg, P. M., & Piotrowski, J. T. (2017). Plugged In. How Media Attract and Affect Youth. Amsterdam, Netherlands: Amsterdam University Press.
*Anderson, D. R. (1998). Educational television is not an oxymoron. Annals of Public Policy Research, 557, 24–38.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

Initials & Name T.E. Franx Student number 4307658

Title of Project Designing an educational experience for toddlers by using animation