LETTING CHILDREN PROVIDE CONSTRUCTIVE FEEDBACK FOR IMPROVING MUSEUM EXPERIENCES

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EXECUTIVE SUMMARY

This thesis describes the process of the development of the MuseumMakers application: a tool for providing constructive feedback by children to museums. The tool only focuses on regular visits, because it is more difficult to collect feedback from younger visitors. This is due to the fact there is no interaction between museum employees and children during these regular visits.

The graduation project explored how to obtain inspiration from feedback from children, aged from 9 to 12 years old, about their museum experience. The aim was to come up with an approach for involving children in providing constructive feedback that can be applied to and used by a large variety of museums. The project takes two museums, Museum Prinsenhof Delft and Science Centre Delft, as a case to start from.

When asking children what they think about their museum visit, they usually react with: 'It was fun.' When you continue questioning and ask what they especially liked, an answer like 'Everything!' is used. This was the feedback baseline for this graduation project.

Levels of participation were indicated to decide what type of participation is preferably for museum educators and children. From a qualitative research study can be concluded that not every museum is open to collaboration with children. Therefore, it was decided to develop a tool that fits the 'contributory' level (Simon, 2010). In other words, the tool was developed to let children provide feedback on their current museum experience.

The need occurred to frame how the feedback appears to be. In order to make the feedback constructive, three elements are needed. Firstly, the museum object or element should be clear. Next, a value judgment should be given to the specific object. Lastly, the feedback should consist the why behind the combination of object and value judgment.

During the conceptualisation phase, a method derived to in order to structure the process of giving constructive feedback. This method is shown in Figure E.1. When children are triggered by a museum object during their visit, they can make a combination of the object and a corresponding value judgment. After this decision, asking a follow-up question can reveal the why behind their opinion.

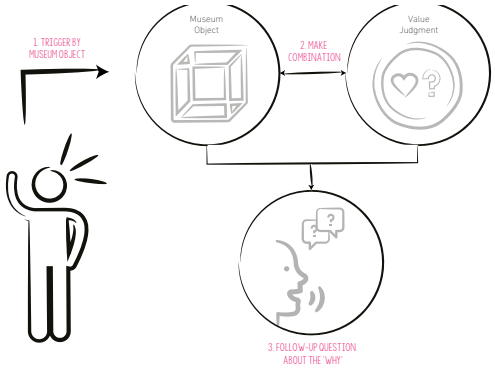

Figure E.1 Method that was proven to work as a structured way of letting children provide constructive feedback

This feedback loop is used in the tool MuseumMakers. In this application, children can pick from nine different statements. They make a picture of the object, combined with the value judgment of their choice. Then a virtual museum employee questions what made them feel that way specifically. For example, what they specifically found irritating or informative. The application can be used during the whole museum visit. Afterward, the application will send the photos and sound recordings to their email address. In this way, children have a digital souvenir of their feedback visit.

This method is used in the feedback loop of the MuseumMakers application. Children can pick from nine different statements, which are the earlier mentioned value judgments. They can make a picture of an object and combine it with a value judgment of their choice. Then a virtual museum employee asks questions about what made them feel that way specifically. For example, what they specifically found irritating or informative. MuseumMakers can be used during the entire museum visit. Afterward, the application can send the photos and sound recordings to their email address. In this way, children have a digital souvenir of their feedback visit.

The design was evaluated in a user research. The research showed that children are able to give constructed feedback to museum educators with the use of the tool MuseumMakers.

No time to read everything?

This report is divided into ten chapters. Please refer to Figure E.2 to see an overview of how these chapters relate to each other. Chapter 2, 3, 4, 5, 7 and 9 provide key insights and references to the most informative figures at the beginning of each chapter.

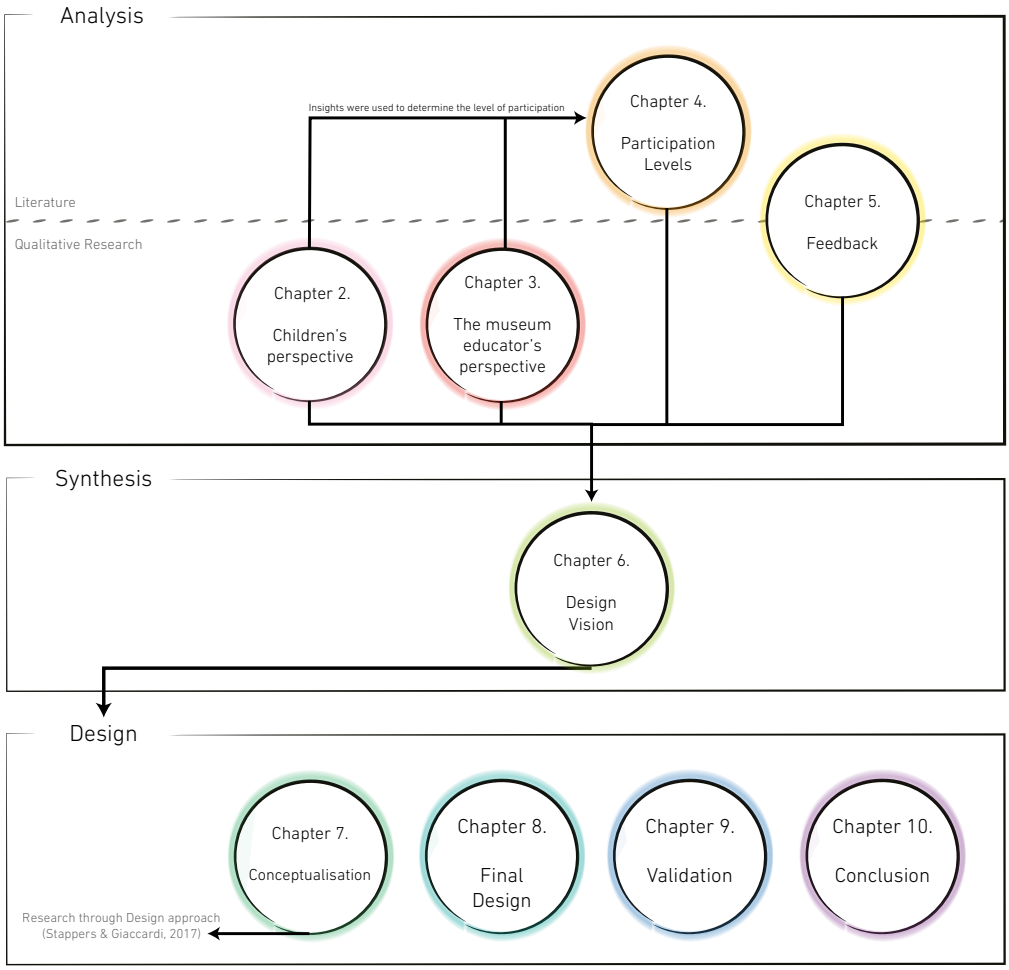

Figure E.2 Structure of this thesis visualized

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1.

The Project

1.A Introduction

From 2011 to 2015 the number of youth visits in Dutch museums increased with 24% (Stichting Museana, 2016). These youth visits are visits by children and youngsters in up untill eighteen years old. But how to increase this number of youth visits even more? Several methods to involve children in museums already exist. However, there is no awareness of any research that shows which of these methods fit the preferences and needs of children. Therefore, this project will explore the involvement of children in museums, based on the feedback about their museum experiences.

This graduation assignment is formulated by the MuseumFuturesLab in collaboration with Science Centre Delft, Museum Prinsenhof Delft and the industry association Museumvereniging, please refer to Figure 1.

Museum Prinsenhof Delft

The Museum Prinsenhof Delft offers the opportunity to explore the history of the Netherlands, history of Delft and delftware. In the museum, visitors will discover the role the citizens of Delft played in the history of the Netherlands and how delftware became the global brand it is today.

Science Centre Delft

This technical and scientific university museum shows recent research and student projects. The Science Centre aims to show research about technology and how to use it. Almost every part of the exhibition is interactive with its visitors.

Museumvereniging

This industry association is occupied with the interests and concerns of the museums in the Netherlands. The association strives for a positive image of museums, high quality and a big and varied audience. Furthermore, the association advertises for all the museums in the Netherlands.

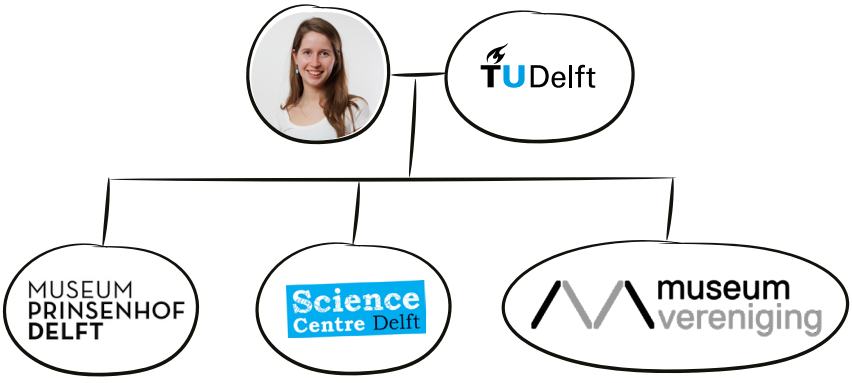


Figure 1 The involved stakeholders of this project.

1.B Problem definition

This graduation project is an exploratory design project to find ways on how children can provide constructive qualitative feedback about their museum experiences. The scope needs to be narrowed down in order to perform extensive research. This means not every type of museum is taken into account. A classical categorization of different types of museums is shown in Figure 2 (Brown Goode, 1896).

This project includes the technological and culture-historical museums, because the two collaborating museums, Museum Prinsenhof Delft and Science Centre Delft, fit in the two included categories.

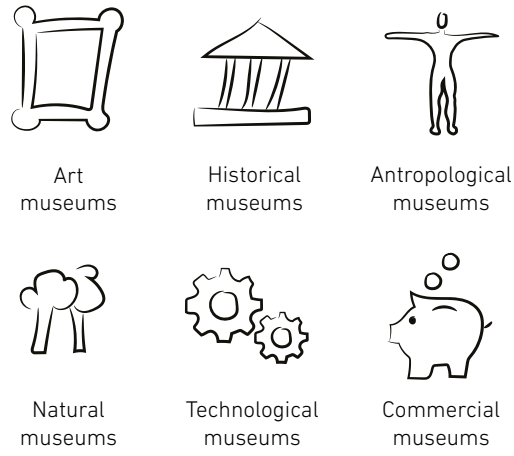


Figure 2 Categorization of different types of museum By Brown Goode. In this project the focus is on cultural historical museums and techonological museums.

At the moment, different ways exist to involve children in museums. For example initiatives like Museumkids, Museuminspecteurs [1] and children's directors. These initiatives encourage children to express their opinions, but the feedback museums get is very general. Please refer to the next page to see how they express their opinion now. Besides giving feedback, involving children can lead to a better relationship between the institution and child. A better relationship can be beneficial for developing new exhibitions or new activities.

Museums or cultural institutions would like to see more constructive and useful feedback from children which will help them create a better museum experience for children. This is hard to achieve, because there is no feedback that reaches the museums and there is no feedback that helps the museum at the moment. The only little feedback that is created by the Museuminspecteurs platform, is equal to the answers children give to general questions in the Museuminspecteur-app [2]. The next two pages illustrate what needs to be changed in order to achieve a desired situation. In this desired situation children will provide constructive and useful feedback to museums. The feedback should be provided in such a way that the feedback is effective for improving museum experiences.

[1] https://museumkids.nl/
[2] https://play.google.com/store/apps details?id=airMuseumInspecteurs

Like mentioned before, children provide no feedback to little feedback while doing an inspection within the museum inspecors platform. This online platform is initiated by the Museum Association. How children can carry out the inspection, is illustrated in Figure 3.

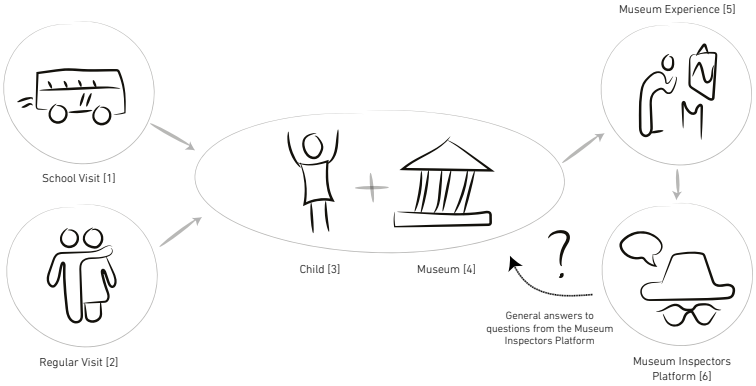


Figure 3 Overview of current context

Inspections are done by the so called 'Museum Inspectors' (in Dutch: Museum Inspecteurs) during regular museum visits. Every child can register as an inspector. In 2016 more than 6.000 children are labelled as museum inspector and they have done 11.000 inspections while visiting a museum (Museumvereniging, 2017). The 'inspector' is asked twelve different questions, ranging from *'Would you like to go back to this museum?'* to *'If you were the director of this museum, what would you like to change?'*.

Three out of twelve questions are open questions with a text box. The exact questions can be found in Appendix A.1.

Figure 4 Quotes from the Museum Inspectors Platform

Answers to the questions provide little feedback to museums about the experience of children, as shown in Figure 4, where four quotes from the platform illustrate what kind of feedback is given.

In the first two quotes only the object and the value judgement are clear. In this case, the value judgement was fun. The thing that is missing, to make the feedback constructive and helpful, is the 'why' what makes them feel this way. The last two quotes partly reveal why children think this object was fun.
In other words, the quotes give a small hint to the why behind their opinion. However it does not yet discloses the full 'why' behind the child's opinion.

Summarizing,the feedback from the Museum Inspectors Platform has two limitations. First, the feedback that can be found on this platform is only about the 'fun' parts during their visit. Answers to other questions are not visible on the webpage. Second, the feedback does not disclose why children find this particular object fun. Additionally, there is no knowledge whether the feedback is received by the museum. Therefore, a field study was performed with museum educators in this project. The results can be found in Section 5.C.

Another problem that is found with the current platform, is the fact museums can influence the elections of kids proof museums. Children are very easy to influence, when they are promised a reward. This is backed by one of the mothers of a museum inspector. She claimed her son wants to give higher grades to museums, when he can win a price for example. Her son really believes when the inspection is positive, the more chance he has got to win the price.

To achieve the goal of this project, a tool needs to be created that provides qualitive constructive feedback from children to museums. With this feedback, the museum employee is provided with new inspiration on how to create a better museum experience for children. The process of getting feedback should align with the daily way of working in the museum.

By processing the collected feedback, the museum employee can adapt to the wishes and preferences of children in their museum experience. This process is illustrated in Figure 5. The higher goal is to achieve a longlasting relationship with museums. The project will focus on the regular family visits because it is more difficult to get to know what children experience during a regular visit. Considering the fact that more interaction with museum employees occurs during a school visit. Please refer to Chapter 3 to find evidence for this choice.

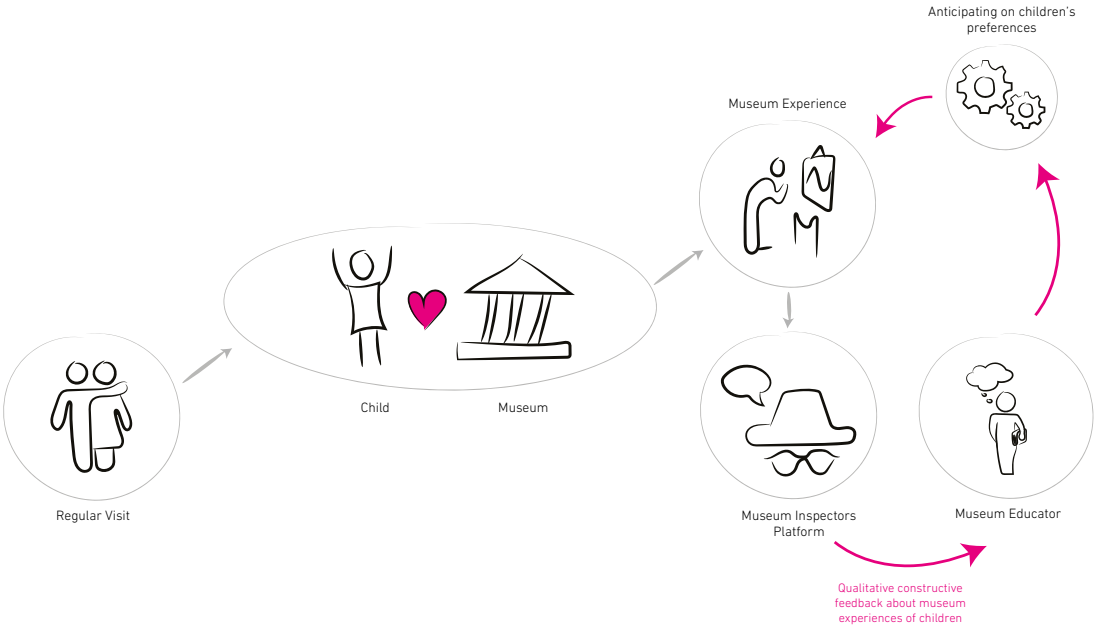


Figure 5 The desired situation.

1.C Assignment

From the previously described problem definition, the following assignment derived:

Design a tool and method that enables children (aged 9-12 years old), who visit museums with their parents, to provide museums with qualitative constructive feedback about their museum experience, in such a way that this feedback is effective in improving future museum experiences of children.

In this assignment, the question that rises first, is how children in this age range think and how their cognitive skills develop. This question will be answered in Chapter 2. Additionally, we need to know how museums can use and want to use the constructive and qualitative feedback. Therefore, a field study with museum educators is done, which is shown in Chapter 3.

1.D Approach

This project is a design project on how to obtain inspiration from feedback of children, aged from 9 to 12 years old, about their museum experience.

The aim is to come up with an approach for involving children in providing creative, constructive feedback that can be applied to and used by a large variety of museums. The project takes two museums as a case to start from. In the evaluation, other museums are taken into account as well. Thus recommendations are formulated that can be inspiring and helpful to other museums as well.

For this project, the design thinking model of the Hasso-Plattner Institute was chosen as a process guideline, because it serves a human-centered approach of designing 'with the user' (Tschimmel, 2012). The stages of this model are described in Figure 6. An orientation phase and evaluation phase were added to the model. The orientation phase was needed to narrow down the scope. The evaluation phase was needed to come to a conclusion for the project. Using a human/ user-centered approach, involves testing with end-users. Therefore, design iterations were needed while making use of the research through design approach described by Stappers & Giaccardi (2017). Now the content and activities in the four main phases will be clarified.

Phase 1: Orientation

In this phase, a deeper understanding of children and museums was gained. This was done be studying literature, websites and by speaking with children who are labelled as Museuminspecteurs. Based on these findings, the target group of children was defined more detailed. This made it possible to select participants for the second phase.

Phase 2: Understand the Preferences and Needs

Generative interviews were organised to get a thorough understanding of the preferences and needs of the children and the museums. The interviews were based on the contextmapping method. The insights were visualised in order to create input for the design boundaries of this project.

Phase 3: Ideate & Prototype

This phase started with formulating a more specific design goal and contained a diverging part. Iterations were made to gradually learn more about what ideas worked for both parties. In this way, a final concept was made, tested and dicussed with all stakeholders. Several aspects of the design were tested to gain a proof of concept.

Phase 4: Test & Evaluate

The concept was developed with more detail and a prototype was created to evaluate. This detailed concept was evaluated with children, as well as with Museum Prinsenhof Delft and Science Centre Delft. Recommendations were listed and a reflection about the project was written.

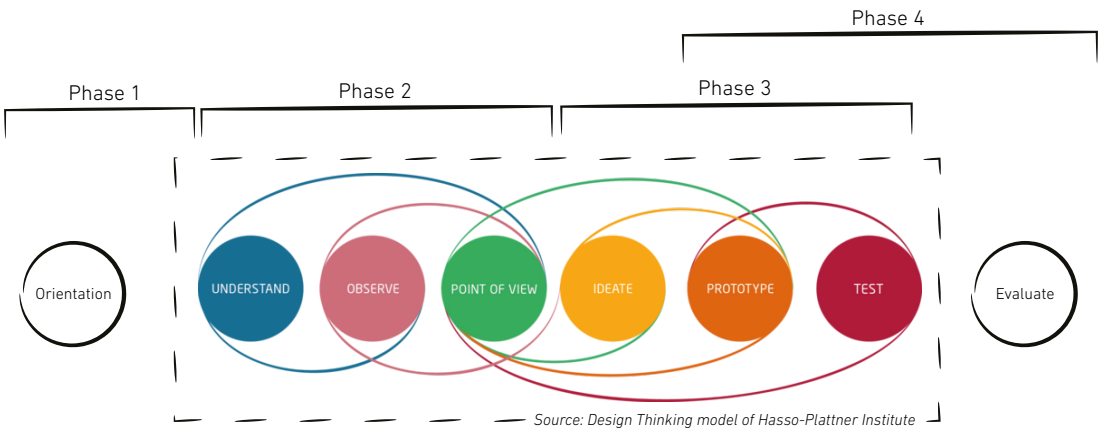


Figure 6 The visualised process of the project

KEY INSIGHTS

Children are very sensitive to leading questions because they are aware of the wished answers from the interviewer.

It is more likely children will tell their opinion to relatives that are close, because there is a relationship of trust.

To understand the different touchpoint (events where the museum employe can ask for feedback), a journey arose from observations.

In the age range of this project, children are able to oversee a situation. However, they find it hard to give contextual information like adults do.

2.

Children's perspective

2.A Museum Inspectors

In order to get to know the museum-inspectors and their families, they were questioned during the Museum Kids Awards on November 10 2017 in museum of 'Beeld en Geluid'. The goal of these interviews was to find out what persuaded them to become an inspector. In total seven interviews were conducted. Four interviews with children who were classified as top museum inspectors. Top inspector refers to the ten children with the highest number of inspections. Three interviews were conducted with the parents of the inspectors. Topics like why being an inspector, how they became an inspector and what aspects they like or dislike of being an inspector, were discussed. In this section only the key insights are shown. Please refer to Appendix A.2 for the exact setup and details of these interviews.

First insight is related to the experience of interviewing children. When talking to a few of the top inspectors, the influence of leading questions was immediately clear. They answered a lot of "wished answers" or answered with only "yes" or "no". Making children feel at ease is one solution to descrease the effect of wished answers.

Besides this learning point, I found out that children do think it is important to fill out the inspection. This is due to two aspects: They can earn points in the current platform. Secondly, they believe it is relevant for museums. However, when they visit a museum that is less interesting to them, the museum is not badly rated. This is shown in the two quotes below.

"Ja ik vind het belangrijk om het in te vullen. Het is zonde als ik het niet invul. Dan mis je een museum bij je stemmen dat vind ik een beetje zonde als ik het niet invul. En volgens mij heeft het museum er wel iets aan."

"Yes, I think it is important to fill it out. It is a pity if I don't. Then you miss one museum together with your votes. And I belief the museum get something out of it."

"Waar je alleen maar saai naar schilderen kijkt, dat vind ik niet zo leuk. Maar ik ga ze niet slecht beoordelen."

"I do not like the museums where you only watch boring to paintings. But I will not give them a negative inspection."

Apparently, children can hesitate to give their real opinion and they face a threshold when filling out the inspection. Not every child faces a threshold. Another child indicated she likes to give an opinion, illustrated by the quote below:

"Ik zou het wel leuk vinden om mee te denken met een museum. Ik kom best vaak in een museum bij Wijchen. Daar hebben ze mij gevraagd 'Wat kunnen we nu doen om het museum kind-vriendelijker te maken?' Mijn moeder doet heel veel met dat museum en ze kennen mij heel goed. Nu gaan ze het plateau verlagen, want kinderen konden de lampjes niet goed zien."

"I would like to think about museums together with museum employees. I go to a nearby museum a lot. They have asked me what they could do, to make

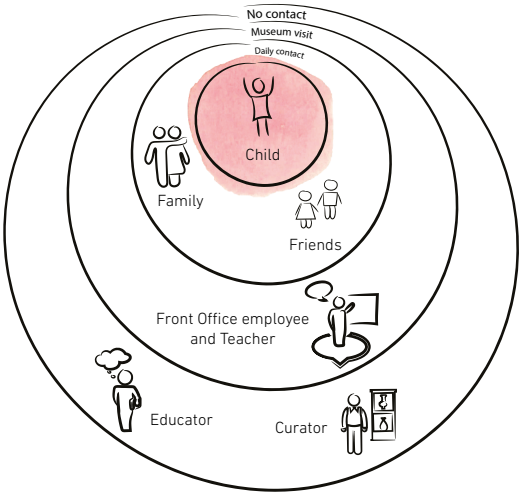


Figure 7 Relationships of children

the museum accessible for children. My mother is a volunteer in this museum and they know me very well. Now they will lower a platform, because children were not able to see the lamps."

In this case, a relationship of trust makes the child speak up to the museum employee. Furthermore, this specific participant shows her willingness working together with museum employees.

Evidently, the relation of trust is of big influence on children's opinion. Therefore, an overview is created to show the relations they have. Daily relationships are taken into account, as well as distant "relationships" that occur when going to a museum. This is shown in Figure 7.

Secondly, there were insights about the parents of the top museum inspectors. Their parents have a very important role while going to a museum. In other words, they are an important part of the museum experience. For example, parents see the inspection as a shared experience, the child fills out the inspection together with one of their parents. Additionally, the parents are the ones who stimulate their children to be a museum-inspector, like the quote below shows.

"Ik heb de website ontdekt en ik gebruikt het als een handig instrument om de vragenlijst door te lopen en ik gebruikte het als een educatief dingetje om te ontdekken wat vonden ze nu echt leuk en wat ze hadden onthouden."

"I discovered this website and at first sight I used it as an educational measure instrument. In order to find out what they liked and what they remembered."

The parents do have a great influence on the museum experience. Therefore, the parents are taken into account in this project. The next quote illustrates that children become more interested in being museum inspector over time. The longer they are a museum inspector, the more they are enjoying it and the more they are used to give their own opinion.

"Toen we voor de eerste keer als gezin een museum inspecteerden, was drie jaar geleden, toen was onze dochter zeven. Toen was ze nog niet bezig met invullen. Nu merk je dat ze het zelf leuk vindt en dat ze een eigen mening geeft."

"When we did the first inspection together three years ago, our daughter was seven years old. She was not concerned with what to say. Now I notice she really likes it and she starts to formulate here own opinion.

Lastly the impact of children on the decision-making process, grows over time. This mother let her children decide on which museum to go next. This insight is represented in Figure 8.

"Laatst hebben we een lijstje gemaakt naar welke musea ze nog willen. Ze kunnen echt zelf kiezen."

"Last time we made a list of museums where to go next. My children are the ones who decide where to go."

A better insight is given about the top museum inspectors, next section will discuss the journey they experience before, during and after a museum visit.

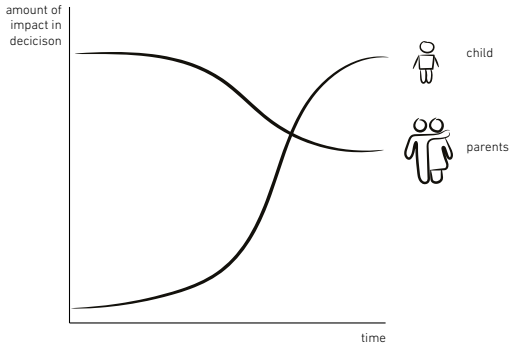
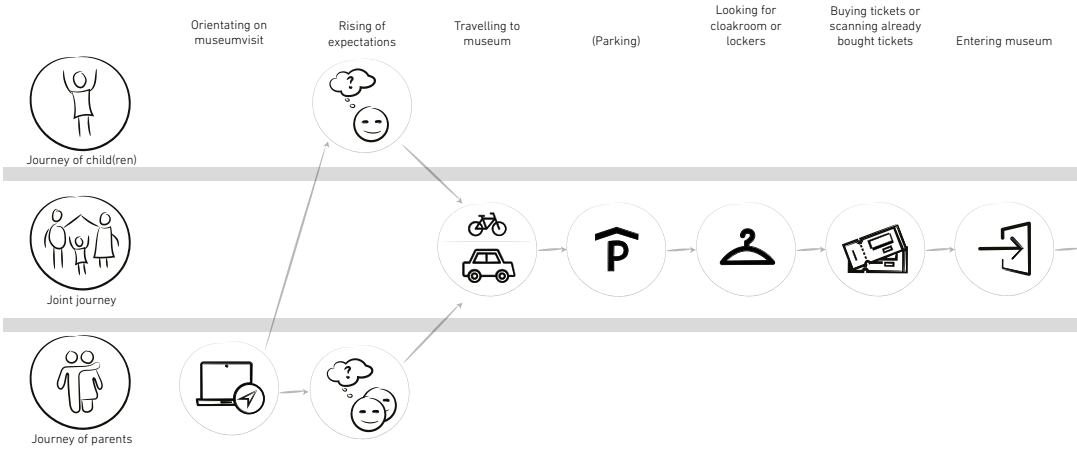


Figure 8 The amount of impact, from parents, in decisions about to what museum to go, decreases over time

2.B Museum Journey

To understand the details of a regular museum visit of a family, observations and informal talks with families are done in several museums. These observations and talks led to a journey that illustrates the touchpoints of a general museum visit. A touchpoint refers to a specific step in the stakeholder's journey where the stakeholder gets in contact with the museum. All touchpoints are combined in a visiting journey that is shown in Figure 9. These touchpoints are the imporant factors of a museum journey, because these are the events the museum employee can ask feedback on.



2.C Children's thinking capabilities

To understand the development of children's thinking behaviour, the theory of Piaget is best known for learning how we know and how we think. Piaget and his colleagues explained how cognitive development rises from interaction between individuals and their surroundings. Piaget's theory distinguishes four different phases. These phases do follow up as one gets older, but there is no association with a strict age number. The four phases are clearly summarized by Verheij, van Doorn and Wielemaker (2015). In the sensomotoric phase, actual thinking does not take place. The motoric skills are developing and the child interacts with his or her physical and social surroundings. When the preoperative phase starts, the child starts to develop the ability to imagine and to symbolize, with the help of play, drawing and language. In the third phase, the concrete-operative phase, the ability of looking back and looking forward grows. Thinking is still about actions linked to concrete objects and actions. In the last phase, the formal-operative phase, thinking can go further than concrete actions and consists of abstract and formal actions as well.

The child is able to draw conclusions from actions and is able to exchange sequences of actions. This theory of Piaget has been complemented by those of several researchers since his death in 1980. He is still the founder, only his theory was not yet complete. The new insights are summarized by Verheij, van Doorn and Wielemaker as well. Table 1 (on the next page) shows these insights, with concrete examples and quotes that illustrate how children think. The quotes are interpreted by the researcher. The content of Table 1 was symbolized in the form of an illustration that is shown Figure 10 (on the next page). It is important to realise, that these age groups are relative and not every child develops the same. Therefore, all phases are described.

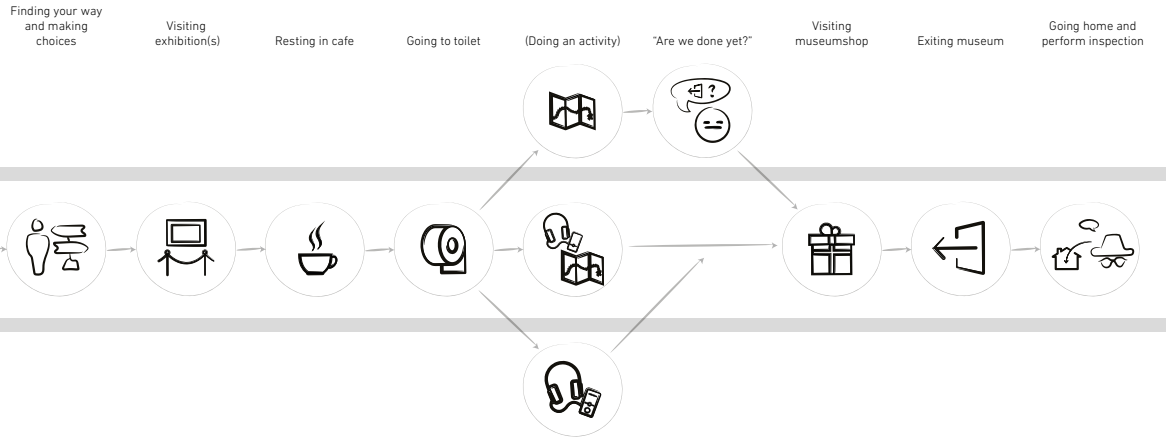


Figure 9 A Journey for parents and child of the musuem visit

Phase	Minimum age	Explanation	Quote (please imagine this quote in the situation when a mother wants to start dinner in 15 minutes)
1. Sensomotoric	0 - 3	The child learns how to move and talk. There is no actual thinking yet.	-
2. Preoperative	3 - 5	The child develops an image of him or herself. Together with an adult the child can focus its attention on the same object. The child learns to use the adult as a reference point. Furthermore, the child is convinced that everyone thinks the same. So only one track of thinking is possible. This means contradictory information is saved separately and is not linked.	"I want to eat this candy, so my mother wants it as well."
Transition	6 - 8	Children learn the differences between people and the difference between fantasy and reality. The child is not yet able to look ahead or back. As shown in the quote, the child does not understand why it is wrong to eat candy right before diner. Now two tracks of thinking are possible. This means the child can exchange between the two frames, but is in one frame at a time.	"But I want to eat this piece of candy now!"
3. Concrete operative	9 - 12	Children no longer react impulsively. Within a concrete situation, the child learns how to oversee the situation by seeing how the two perspectives fit next to each other. Children can interpret from the here and now, but cannot yet give extra contextual information, like adults do. As the quote illustrates, the child is starting to negotiate.	"Why can I not get this candy? But what if we eat late today, can I eat it then right now?"
Transition	13 - 15	Now the youngster can imagine what is about to happen. He or she can put several alternatives next to each other and oversee and compare the possible consequences. Social relations and interaction are valuable to them. The youngster starts to think up hypotheses and conclusions. With this in mind, the behaviour with more nuance will be selected.	"I should not eat this candy (or peanut butter sandwich) right now, since we will eat dinner in fifteen minutes. My mother will not like it, because she put effort into making a dish that I like."
4. Formal operative	≥ 15	The adolescent is now aware of his or her own choices, wants to be independent and is looking for his or her own identity. Furthermore, the adolescent will make flexible choices, based on context factors, the interpretations of others and the behaviour of others. He or she is able to know how the multiple tracks of thinking relate to each other. This means that several considerations are accommodated in their brains at the same time.	"Eating this candy makes me unhealthy. My friend does not like it, since she is on a diet as well. Besides, my mother starts whining if I eat it before dinner."

Table 1 Explanation of phases

To put the information of Table 1 in another way, according to Verheij, van Doorn and Wielemaker we can conclude the following:

When asking an eight-year-old 'Why do you do this?', he will answer the question impulsively. A ten-year-old will interpret the question that his or her behaviour needs to be changed. Last, a youngster will answer the question like how he or she wants to be. Additionally, when asking the question 'Why do you think this?', an eight-year-old will answer 'Because...'. The ten-year-old will call it as the best choice in the situation and the youngster can explain the considerations he or she made in order to answer the question.

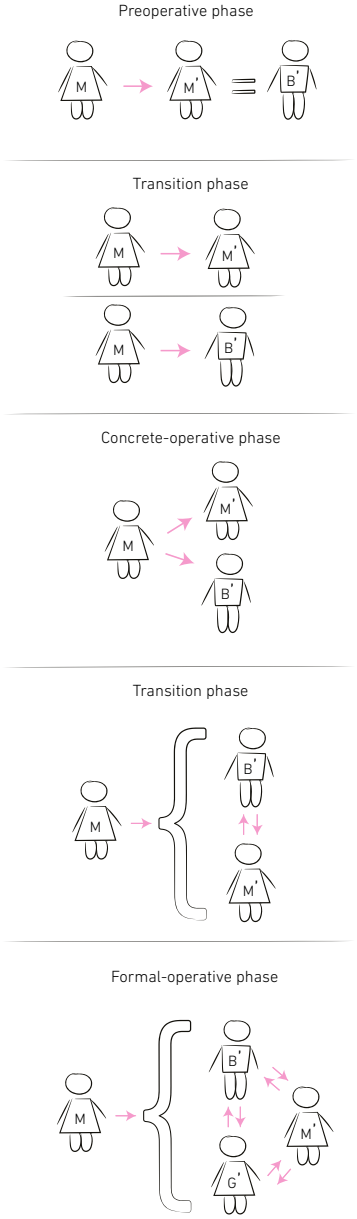


Figure 10 *This image symbolizes the different thinking phases. M stands for the child itself. M' stands for the represented image of itself. B' stands for the represented image of another child or person.*

KEY INSIGHTS

There is a big distinguishing in the way of working from formal and informal museum institutions.

Not every museum educator is open to collaboration with children. Educators have most concerns about the development of new educational activities after their ideation phase. They really would like to check if their assumptions are right with the targeted group.

Currently used methods for getting feedback in museums are observations, questionnaires, observations from front office employees or feedback via social media. The observations lack in content because these observations are based on assumptions about children's preferences. In the other used methods only the option of parents are too little and assumptions. Other methods have shown the opinions of parents or a combined family opinion. This means no method is available where constructive feedback is provided that is only from the child's perspective.

3.

The museum educator's perspective

3.A Introduction

This project is exploring a way to get constructive qualitative feedback from children. Therefore, we need to know how the museum employees work and how the feedback from children can be implemented in their day-to-day work. Furthermore, you can wonder if the museum employees are willing to involve children in their development-process. This chapter will give answers to these questions. In the results section a development-journey and personas of the museums will be presented.
So far there was only refered to the museum employee. From now on two types of employees are distinguished. The difference between museum educators and museum teachers is explained in Figure 11.

3.B Method

In this paragraph, the setup of the field study is discussed.

Research Questions

In order to achieve the goals of this field study, which are to create personas and a development journey, four research questions were formulated:

1. What type of decisions are being made about educational matters?

2. To what extent are museum educators open to children's opinions?

3. By what are museum educators influenced?

4. To what extent are museum teachers able to deviate from the content of a museum lesson or guided tour?

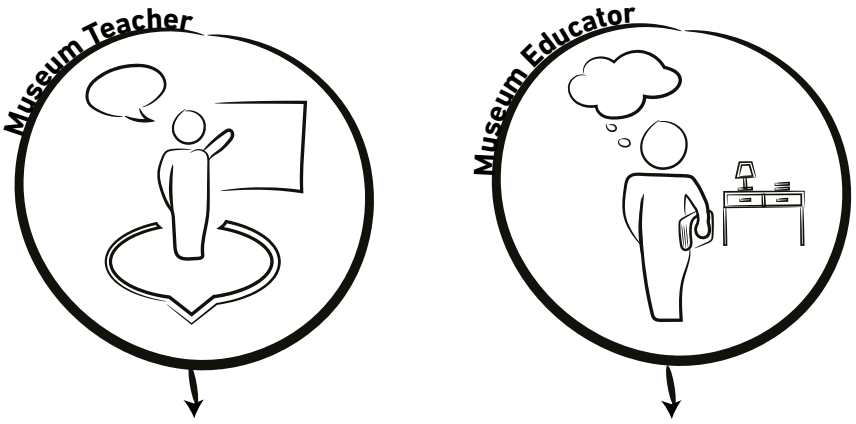


Figure 11 The difference between museum teacher and museum educator is that the teacher performs and the eduator develops.

Setup

After formulating the research questions, the research was set up. The contextmapping method was used in combination with interviews. Contextmapping is an approach to design, that takes a holistic perspective on end-users (Sanders & Stappers, 2012), in this case museum educators. The educators were addressed as an expert by the researcher. First the participants were asked to fill in a sensitizing booklet. Sensitizing means literally 'making people sensitive to...'. In this case making them sensitive to the interview, since participants are not aware of their latent knowledge. The booklet is a way of making them aware of their actual preferences and needs, and will reveal their latent knowledge.

The booklet consists of several little assignments, which are linked to the research questions. 'My workday in our museum', 'Stories about my work', 'Me & my colleagues and tools', 'Our museum & our decisions' and 'My motto' were the five topics addressed in the booklet. the participants were able to fill out these assignments of about ten minutes the five days prior to the interview. In Appendix A.4 the content of this booklet is shown.

The interview adopted a semi-structured approach. The pre-determined set of questions was printed in a 'raging reporter' booklet. In this way, the researcher could easily report notes or quotes. One pilot study has been done with a fictional museum educator. Afterwards, the pre-determined set of questions was adjusted and reordered.

Participants

After composing the research questions and preparing the setup, participants were selected. Like discussed in the scope of this project, only museums with a specific background were selected. Two requirements for the museum employee were used:

- Participant should work in a technologic or culture-historic museum

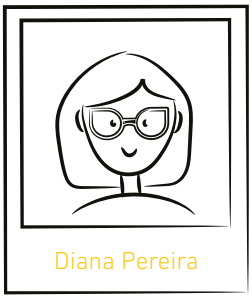
- Participant should work as head of education or be in charge of developing (educational) activities for children

These requirements were made, since the museum educators determine what activities will be developed for children. They are the target-group who can have the most benefit from the outcome of the project and the outcome should fit to their needs. The museum teachers were excluded for this part of the research, since they are not in a position of making decisions.

After selecting five museums, individual appointments were scheduled with the participating museum educator for a one hour face-to-face interview at their work preferably. This is done so the participants could feel more comfortable and open to the researcher. On the next page, Figure 12 shows an overview of the five participants who joined the research.

Analysis

After conducting five interviews, the most important and interesting quotes were transcribed by the researcher. Only quotes that reveal the way of working in the participant's museum [1] or that reveal wishes and needs of the participant [2], were selected. From these quotes, statement cards were created. These statement cards were, together with students of the Museum Futures Lab, clustered to get new insights about the preferences and needs of the museum educators.



Diana Pereira

Function:
Educator

Years of experience:
5 years

Museum:
Museum Prinsenhof Delft

Number of visitors per year:
± 100.000

"Ik merk zelf dat je pas goed met educatie bezig kan zijn als ik een beeld heb van hoe de tentoonstelling er uit gaat zien. Daarvoor vind ik het heel moeilijk om het voor me te zien."

Janneke Franicssen

Function:
Educator

Years of experience:
1 year

Museum:
Zaans Museum Zaandam

Number of visitors per year:
± 110.000

"Bij het bedenken van een nieuwe rondleiding ga ik met de curator van het museum het terrein rond, hij kan me dan van alles vertellen. Ik lees nog wat en praat met anderen, zodat alle puzzelstukjes in elkaar vallen en dan kan ik aan de slag."

Rob van den Berg

Function:
Director

Years of experience:
9 years

Museum:
Space Expo Noordwijk

Number of visitors per year:
± 80.000

"Een goede tentoonstelling moet net zo zijn als een bos. De meeste mensen vinden een bos leuk, maar je gaat er met andere doelen naar toe. De een gaat voor vogeltjes, de ander komt voor de rust en de ander wil paddenstoelen zoeken."

Activities on top of the collection or exhibition

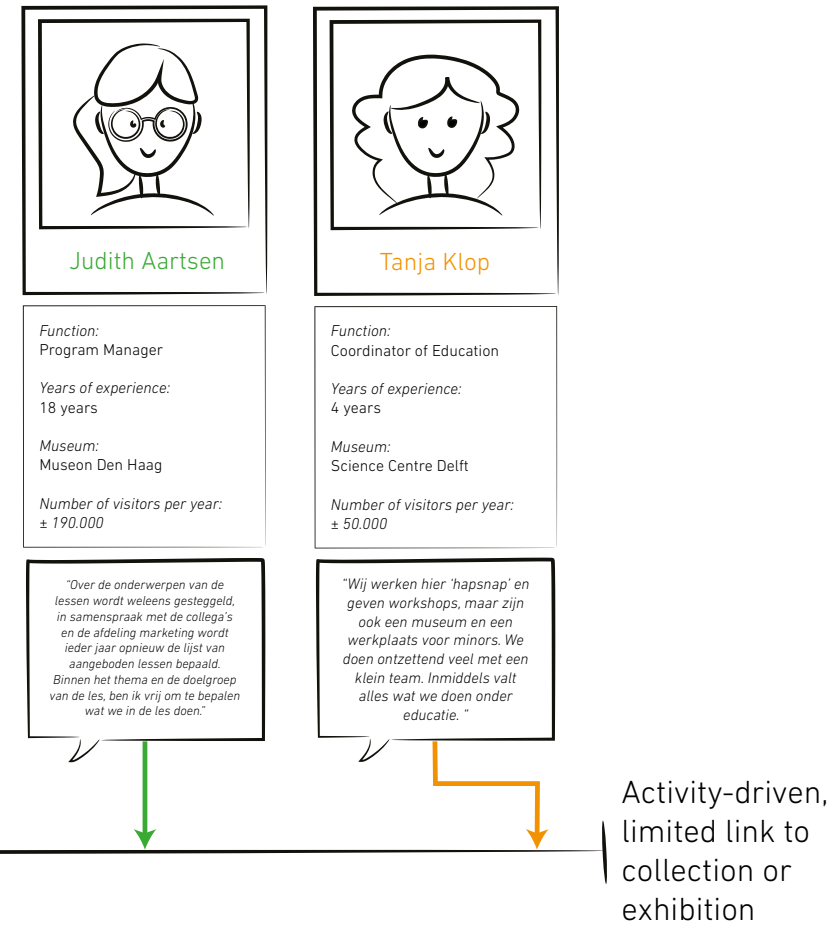


Figure 12 Overview of participants of field study

3.C Results

The clustering of statement cards resulted in three personas, a developing-journey and a overview map of different ways for receiving feedback.

The clustering of statement cards resulted in two specific characteristics of the participated museum educators and their museum. Firstly, a big difference in the willingness of children's participation was revealed, this is visualised on the horizontal axis of Figure 13. The second characteristic was the amount of hierarchy in a museum organization. Therefore, the vertical axis is divided in formal and informal organizations. The three personas that were created all have a specific place this axial system.

In this project, we shall try to focus on every persona in this axial system. The three personas, Jaap, Marjan and Josine are respectively shown on the next three pages in Figure 14, Figure 15 and Figure 16. The specifying titles were chosen by the researcher because it describes the persona in two words. These figures present the main insights, where in Appendix A.5 more elaborate personas are shown.

The personas represent the differences in formality in their organization and their willingness of collaboration with children. Besides, the personas gave insight on the different functions of museum employees and their involvement with younger visitors.

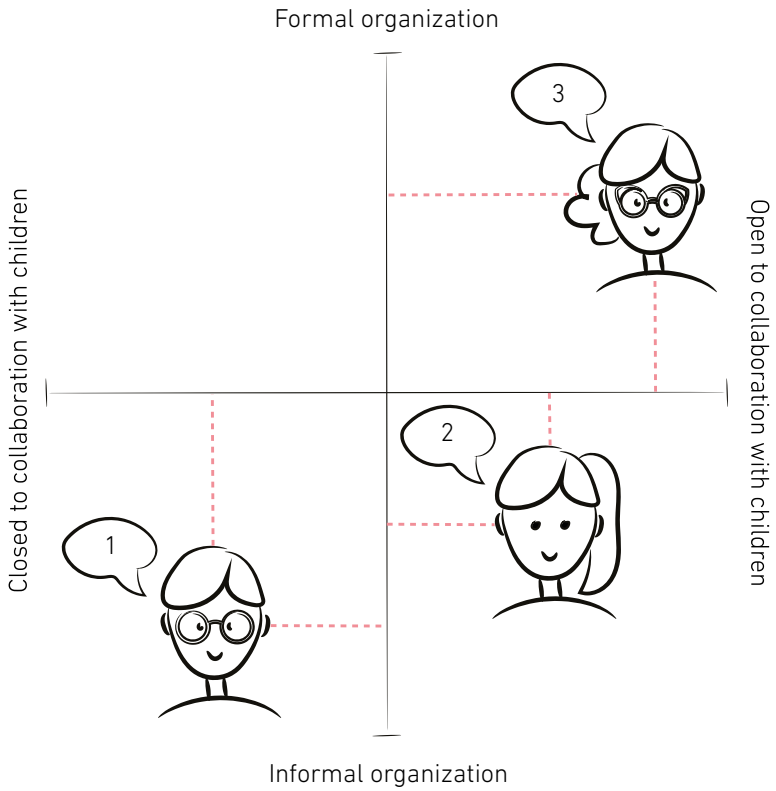
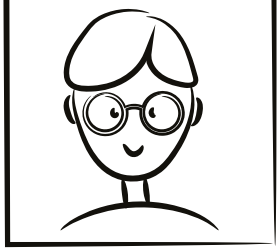


Figure 13 Difference between museum teacher and museum educator

DETACHED KNOW-IT-ALL

Terughoudende Wijsneus



Name:
Jaap

Function:
Combined function of specialist, curator and educator

Years of experience: 5

No educational department

Number of visitors per year:
20.000

"Best part of the day is when I walk through the museum and see what is happening."

CHARACTERISTICS

WALKING THROUGH MUSEUM

CREATING THE BEST MUSEUM EXPERIENCE

IMPORTANT COLLEAGUES

VOLUNTEERS

ENCOURAGING BOSS

CERTAINTIES

MAKE USE OF ACTIVITIES THAT WORKED IN THE PAST

NO COLLABORATION WITH CHILDREN

CONCERNS

MONEY AND TIME

FIT WITH TARGET-GROUP

Figure 14 Detached Know-it-all persona

WAIT-AND-SEE ALL-ROUNDER

Afwachtende Alleskunner

Name:
Marjan

Function:
Museum educator and teacher

Years of experience: 2

Small educational department
(± 3 FTE)

Number of visitors per year:
100.000

"I believe education should free ride on the fun aspect in a museum. Children learn easier when they have a good time. It is our job to achieve this!"

CHARACTERISTICS

WALKING THROUGH MUSEUM

CUSTOMIZED GUIDED TOURS & ACTIVITIES

IMPORTANT COLLEAGUES

EDUCATORS

FRONT-OFFICE EMPLOYEES

CERTAINTIES

CONTENT OF TRAININGS TO CO-TEACHERS

EXPERIMENTING WITH NEW IDEAS

CONCERNS

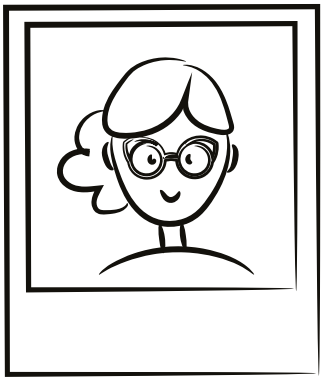
NO SHARED RESPONSIBILITIES

TIME & NUMBER OF TASKS

Figure 15 Wait-and-see All-Rounder persona

DIRECTIVE-FOLLOWING REGULATOR

Richtlijn-volgende Regelaar



Name:
Josine

Function:
Head of educational department

Years of experience: 18

Big educational department
(± 10 FTE)

Number of visitors per year:
190.000

"We have so much experience, so we know what works and what does not work in our museum. That is why we often think: We shall see what happens!"

CHARACTERISTICS

HONEST ANSWERS
ABOVE NICE ANSWERS

SAME WAY
OF WORKING

IMPORTANT COLLEAGUES

DEMANDING
BOSS

DYSFUNCTIONAL
FAMILY

CERTAINTIES

YEARS OF
WORK EXPERIENCE

TRAINING TO
MUSEUM TEACHERS

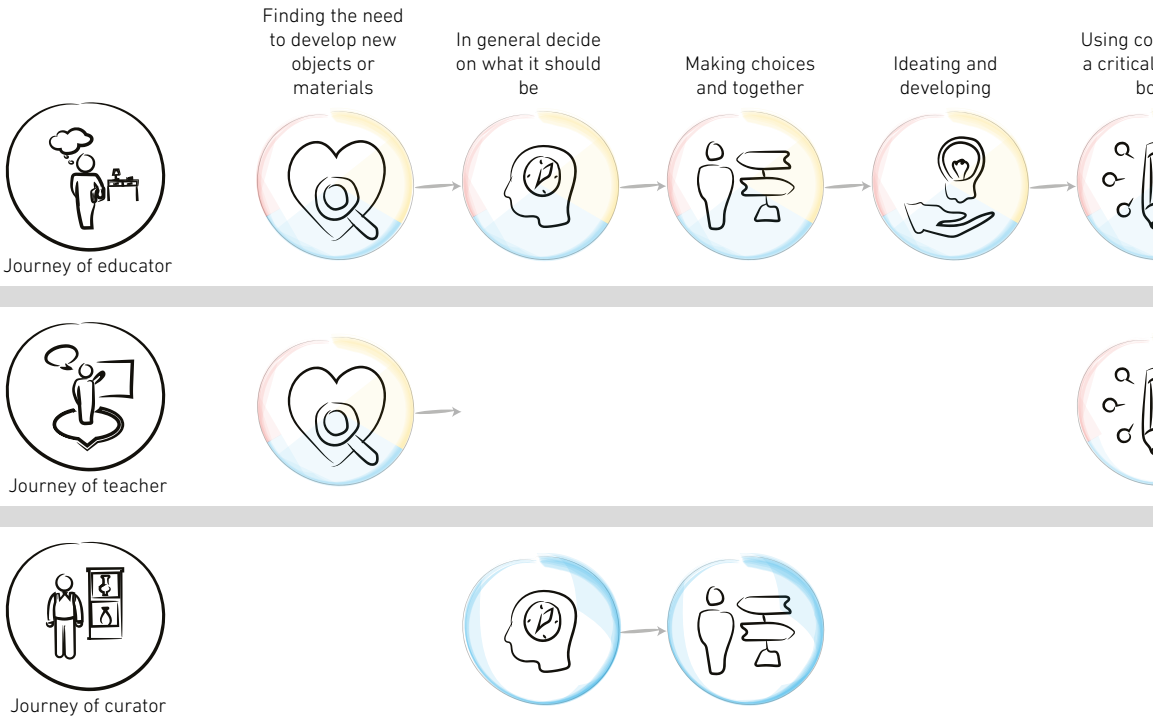
CONCERNS

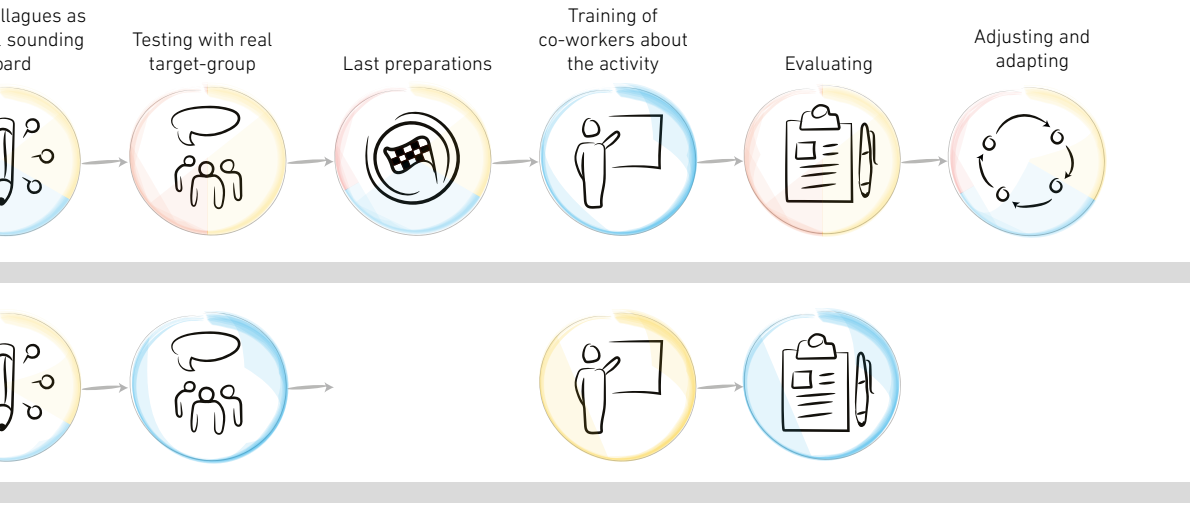
PROFESSIONAL
REPUTATION

EVALUATING WITH
MUSEUM TEACHERS

Figure 16 Directive-Following Regulator persona

Second, the research resulted in a developing-journey, illustrated in Figure 28, that shows the overlapping stages the interviewed museums take when developing educational activities. The colours in this figure correspond with the roles of the personas. The figure shows that the more formal institutions are (blue correspond with Josine), the more input from colleagues will be used instead of from children, while developing educational activities.





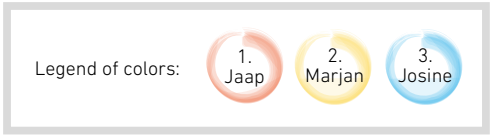


Figure 17 Journey of development in a museum

Lastly, an overview map is created, that reveal several methods which are used to get feedback from visitors of regular visits and school visits. Please refer to Figure 18. The size of the circle shows how often this method is used by the several participants. The image shows it is more difficult to get feedback from regular visits. Because there are less used methods. Besides, interaction with a museum teacher occurs during a school visit. This does not happen during a regular. Therefore, it is beneficial this project will focus on these regular visits.

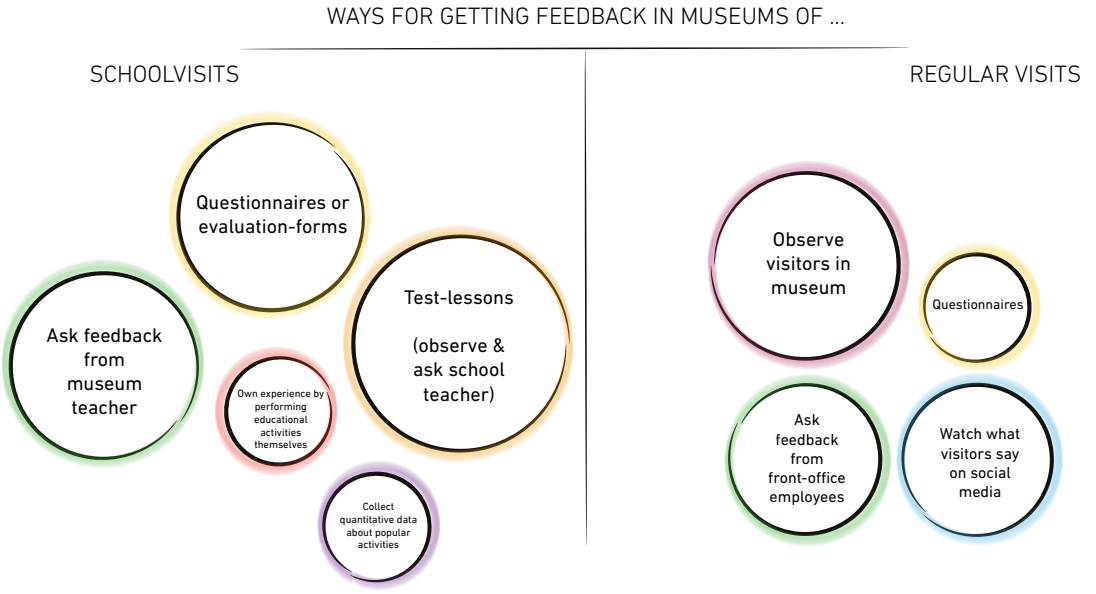


Figure 18 Ways for getting feedback in the interviewee museums

3.D Conclusion

To conclude this chapter, the research questions of this Chapter will be answered in this section.

1. What decisions are being made about educational matters?
First the decisions that are being made, are revealed by making a journey with all touchpoints or stages. This gives an overview where to intervene with the tool. It is preferred by museum educators to intervene with the feedback of children right after the ideation phase of new activities.

2. To what extent are museum educators open to children's opinions?
The personas show that not everyone is willing to involve children during their process of development. This is an important insight that was needed to make a decision on the participation level of children in Chapter 4.

3. How are museum educators get influenced?
There is no easy answer to this question. Every museum educator is influenced in a different way. One key point that became clear from the interviews, is that inspiration does not come at once or at a certain moment. Furthermore, educators are influenced by a lot of colleagues, which is illustrated in the personas. Lastly, the research showed they do not make use of the feedback that is presented on the Museum Inspecteurs platform.

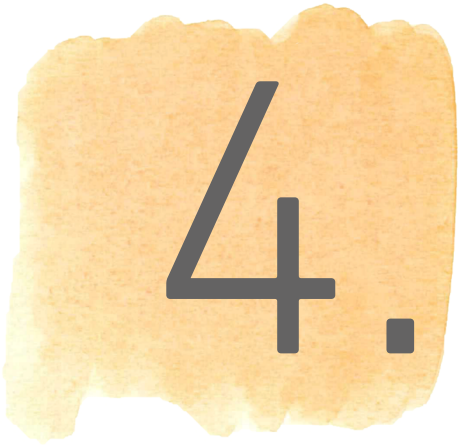
4. To what extent are museum teachers able to deviate from the content of a museum lesson or guided tour?
The personas showed an answer to the fourth research question as well. We now know not every museum educator gives the exact amount of freedom to their museum teachers. This is linked to the amount of formalities in the organization.

3.E Discussion

The results of this study only represent the beliefs and opinions of the five participations in this study. Because of a little number of interviews, it is not certain every museum educator fit in the outlined personas. Due to a broad range of functions a wide variety of people was interviewed.

KEY INSIGHT

Children do not have the capabilities to be in the lead of co-creative of hosted projects. Museum educators are not always willing to collaborate with children. In other words, the skills of both stakeholders do not comprehend the higher participation levels. Therefore, this project focusses on the first participation level: create feedback about the current museum experience.



Participation Levels

4.A Participation in Museums

In the book 'The Participatory Museum' of Nina Simon (2010), four levels of participatory museums are distinguished.

1) On the first level, called contributory projects, visitors are solicited to provide feedback. This feedback includes very different forms. For example, a comment board or story-sharing kiosk. On this level only a small number of staff support is needed.

2) In collaborative projects, visitors are invited to create something. Simon distinguishes two types of collaboration: consultative projects and co-development projects. In consultative projects participants are asked for advice on new ideas, where in co-development projects participants really participate in the ideation phase.

3) A co-creative project goes one step further, and these type of projects allow participants to use scientific techniques together with staff-members. The whole project is defined together, like the project goals and the generating of the program or exhibit.

4) The last level of participation that Simon added, is called hosted projects. In these projects, institutions turn over their facilities and/or resources to visitors. According to Simon, hosted projects allow participants to use institutions to satisfy their own need with minimal institutional involvement.

Additionally, Simon pointed out questions to determine on what participation level a project works best. In Table 2 these questions and answers are shown.

In the current project a decision should be made about on what level the tool should operate. From this table, it can be concluded that the third and fourth level, respectively called co-creation and hosted, are not appropriate while working with children in the age range from nine to twelve. Especially when you look at the consequences of institutions relationships with children (third row in Table 2). Children are not able to lead a project or to be in charge of some rules and resources. When a museum wants to participate with children on these levels, a third adult party needs to be involved, like a facilitator.

	Contributory	Collaborative	Co-Creative	Hosted
What kind of commitment does your institution have to community engagement?	We're committed to helping our visitors and members feel like participants with the institution.	We're committed to deep partnerships with some target communities.	We're committed to supporting the needs of target communities whose goals align with the institutional mission.	We're committed to inviting community members to feel comfortable using the institution for their own purposes.
How much control do you want over the participatory process and product?	A lot - we want participants to follow our rules of engagement and give us what we request.	Staff will control the process, but participants' actions will steer the direction and content of the final product.	Some, but participants' goals and preferred working styles are just as important as those of the staff.	Not much - as long as participants follow our rules, they can produce what they want.
How do you see the institution's relationship with participants during the project?	The institution requests content and the participants supply it, subject to institutional rules.	The institution sets the project concept and plan, and then staff members work closely with participants to make it happen.	The institution gives participants the tools to lead the project and then supports their activities and helps them move forward successfully.	The institution gives the participants rules and resources and then lets the participants do their own thing.
Who do you want to participate and what kind of commitment will you seek from participants?	We want to engage as many visitors as possible, engaging them briefly in the context of a museum or online visit.	We expect some people will opt in casually, but most will come with the explicit intention to participate.	We seek participants who are intentionally engaged and are dedicated to seeing the project all the way through.	We'd like to empower people who are ready to manage and implement their project on their own.
How much staff time will you commit to managing the project and working with participants?	We can manage it lightly, the way we'd maintain an interactive exhibit. But we ideally want to set it up and let it run.	We will manage the process, but we're going to set the rules of engagement based on our goals and capacity.	We will give much time as it takes to make sure participants are able to accomplish their goals.	As little as possible - we want to set it up and let it run on its own.
What kinds of skills do you want participants to gain from their activities during the project?	Creation of content, collection of data, or sharing of personal expression. Use of technological tools to support content creation and sharing.	Everything supported by contributory projects, plus the ability to analyse, curate, design, and deliver completed products.	Everything supported by collaborative projects, plus project conceptualization, goal-setting, and evaluation skills.	None that the institution will specifically impart, except perhaps around program promotion and audience engagement.
What goals do you have for how non-participating visitors will perceive the project?	The project will help visitors see themselves as potential participants and see the institution as interested in their active involvement.	The project will help visitors see the institution as a place dedicated to supporting and connecting with community.	The project will help visitors see the institution as a community-driven place. It will also bring in new audiences connected to the participants.	The project will attract new audiences who might not see the institution as a comfortable or appealing place for them.

Table 2 Four levels of participation by Nina Simone (2010)

4.B Participation in Education

Where the Nina Simon's model in the previous section was focused on adults, the need occurred to find participation levels that show a role division of children and adults, while working together. Therefore, a search of literature in the educational field was done. The CED-group wrote the book 'Team players; student participate in education', where they illustrate 27 situations how pupils can participate in their own education (CED-Groep, 2009). The teacher can use this book as a guideline when they want their pupils to participate. In Table 3 one of the examples is shown; the text is literally translated to give inspiration of the five levels of participation of pupils. The table shows the different roles of pupils and teacher on each level, when inventing a new game together.

This example shows in a clear way the role-division of pupils and teacher on the five different levels. The higher the level, the more intrinsic motivation is needed from the pupils.

Although this example provides inspiration to work with children on different participations levels, the context of this project is very different. While visiting a museum on a regular day as a family, there is no teacher-role in the situation. The employees of this museum have a very different relation to visiting families. These downsides should be taken into consideration, while using the content in this project.

When comparing the two previous described models, resemblance can be found. The model from Nina Simon is used in the museum context, and the model from CED-group is used for the targeted group specifically. When comparing the definitions of the participatory levels of those two models, they correspond. Therefore, these definitions, of both the educational context and the museum context, were combined and re-explicated. This is shown in Figure 19.

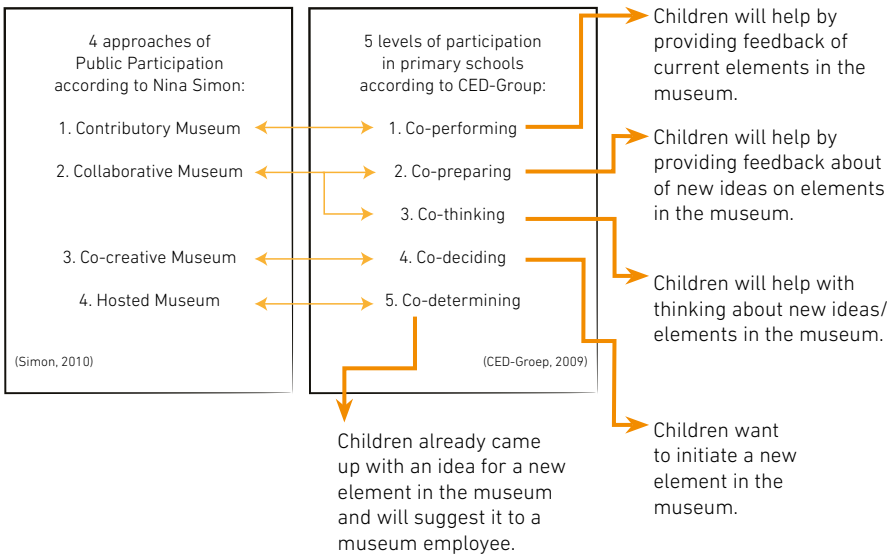


Figure 19 Combined definitions

	Pupils	Teacher
Co-performing	A few pupils will help the teacher when executing a game. They can have the role of assistant, team-leader or referee.	The teacher plans and introduces the new game. Beforehand he made preparations, for example how the roles are divided. He explains and accompanies the game.
Co-preparing	The pupils help with preparations of the materials that are needed in this new game. Additionally, they can divide the teams and make sure the tables are set in the right way. They make sure everything is ready.	The teacher wants to introduce the new game and made plans beforehand. During the preparations, he helps the student when needed. He makes sure everything is fixed on time. Last, he helps with executing the activity.
Co-thinking	The pupils help with thinking of the new rules of the new game. Additionally, the help with preparations and execution of the activity.	The teacher makes a pre-defined list of questions to set up rules for a new game. He deliberates these questions with the pupils and helps them with preparation and the execution of the new game.
Co-deciding	The pupils want to come up with their own game. They think of what needs to happen and how they this needs to be done. Questions like 'When can we play the game? What materials are needed? What will the classroom look like? How will we explain the new game to our classmates? How will we accompany the game?' need to be answered. The pupils need to ask the teacher when they can play the game. The pupils need to practise with the explaination of the game and roles (game-leader, referee, assistant, team-leader etc.) need to be divided upfront. Than the game can start.	The teacher asks the pupils who knows a new game to play with the whole class. He accompanies the student who has a good idea with planning the activity. He makes sure the plans are feasible and helps them executing their plans.
Co-determining	Student already came up with a new game and want to play this together with the whole class. The make plans for organizing and executing the game.	The teacher allows the pupils to prepare and execute the new game. He only accompanies with executing of the game.

Table 3 Five participation levels according to CED-group (2009)

Note that the term 'collaborative' of Simon, is split in two categories according to the CED-Group, namely co-preparing and co-thinking. However, Simon distinguishes in the collaboration level two levels as well. These levels are respectively 'consultative' and 'co-development'. These two sub-levels do not totally overlap with the 'co-preparing' and 'co-thinking levels' of the CED-group.

4.C Children's opinion about participation

With the models of participation in mind, I was wondering how children feel about participation. Besides, the question rose if functional constructive feedback can possible be given by children on abstract topics like decision-making. Davey, Burke and Shaw (2010) researched what children think of participation in decision-making processes in three different contexts. These contexts were respectively the school environment, the home environment and the local area. This page summarizes the important aspects of the methodology and insights of the research.

The aim of the litereature review was to discover methods researchers use to let children talk about an abstract aspect like decision-making. The report is based on findings from twelve focus group interviews. The interviewees aged between three and twenty years old and were interviewed in groups with six to eight participants. A little note on the methodology shows that the questions that were asked, were **phrased in a depersonalised way**. This means the questions started with, 'do you think children of your age...'. This gave children the opportunity to give more open and honest answers to the questions. Furthermore, this research used **prompt cards** to stay focused on a particular issue with younger children.

The findings show that children could be rational, reasonable and honest about their understanding of the context. When effective mechanisms for engaging children in decision-making processes are embedded in the culture of a school, children can make responsible decisions, even from a young age. An important factor is to **provide feedback on the decisions that were taken.** Otherwise, the children question the validity of the school council and the willingness of staff to actually share power with pupils.

Additionally, a pitfall can be that children do not feel that they are taken seriously, when they get the feeling schools share their power to tick another box.

When the children had to answer the question about how to engage other children more in decision-making processes, they made the importance clear of having different media. Suggestions ranged from having a comments box, discussion boards on the schools' website, but also using sport as a way to elicit children's views on key issues. Furthermore, children wanted to break down the power barrier that often exists between adults and children, in order to let them participate. Last, they suggested planning more discussion meetings to ensure children can give their opinion too. The children had mixed views whether these meetings would be with or without adults.

To conclude, the report shows that it is possible to get the opinion of children on topics like decision-making, but you need to **correctly frame the questions** and **discuss their answers with them**. Even very young children can give their opinion about the decision-making process, which shows the importance of engaging children in participatory processes from a young age. In this way children gain specific skills and they feel respected and valued.

4.D Conclusion

This chapter showed the combined definitions of two participation models. The insights from Chapter 2 proved that only the participation levels of 'contributory' and 'collaborative' (Simon, 2010) are feasible to execute with children. Additionally, the model of the CED-group showed the role division of adult and child on different participation levels. Lastly, the study of Davey, Burke and Shaw showed us the correctly framing the questions and how to discuss children's answers together with them.

As described in the current chapter several participation levels exist in the context of this project. When combining the insights of the personas of Chapter 3, it is clear not every museum educator is open to collaboration with children. The first participation level in museums, described by Nina Simon (2010), is called 'contributory'. This level does fit every persona. For the simple reason that the tool should serve all museums, the tool fits in a contributory project. The two personas that are open to collaboration with children, are likely asking for a tool that links a consultative collaborative project, or a co-development collaborative project.

The participation levels that are used in this project, are shown in Figure 20. This project focusses on the first participation level. To achieve the second participation level, another design project is needed, with a different perspective and goal. The third level is complicated to solve with a tool. Because the educator needs to gain too many skills to perform a co-creation workshop or session. A third party needs to be hired, to perform such a session. Therefore, only the first level was addressed during this design project.

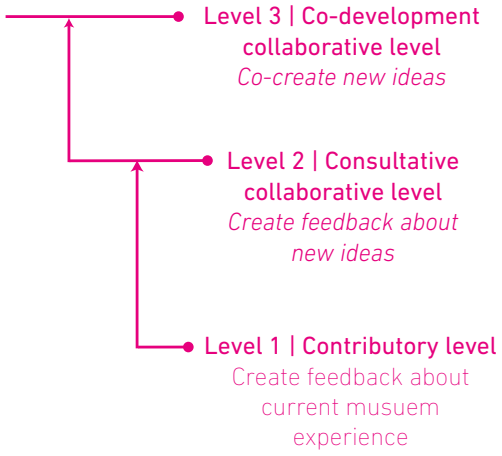


Figure 20 Three participation levels

KEY INSIGHTS

This chapter shows the importance probing questions. These questions are needed to get the feedback you are looking for. The ideal feedback that should be achieved in this project is shown in Figure 22.

For children, it is easier when the process of giving feedback directly follows after the corresponding event. Lastly, a should be created that is beneficial for the child's museum experience. The aim is to create psychological ownership of the child. Because this will prevent boredom.

5.

Feedback

5.A Introduction

This chapter pays attention to different ways of collecting constructive feedback together with children. With this in mind, the right guidelines for this project will be stated.

When referring to constructive feedback, this means the outcome provides useful and inspirational feedback for museum employees. Second, qualitative feedback means the feedback should describe the quality of the museum experience. Lastly, in situations to enhance learning, effective feedback, should answer three questions (Hattie & Timperley, 2010):

- Where am I going? This 'Feed Up' refers to the goal of the one that is learning, who is in this case the museum employee.

- How am I going? This 'Feed Back' refers to the learning curve, the steps that have been taken and how this contributes to the goal of the museum employee.

- Where to next? This 'Feed Forward' refers to the following steps the museum employee can take, in order to achieve the goal.

In the context of this project, only the 'How am I going?' question is interesting for museum educators to get answered by children. With the insights that derive from the provided feedback, the museum employee himself can answer the first and third question. In this way, a full feedback loop was made and museum educators can improve museum experiences for children.

5.B Interview with primary school teacher

Literature about the development of children's thinking was discussed in Chapter 2. However, we do not have practical insights about how this works in reality. That is why an interview with a primary school teacher is done, to figure out the practicalities when asking for children's feedback. Additionally, the goal is to comprehend the lower limit of what children are able to say, when giving feedback at the start of the concrete-operative phase.

The participant is a teacher in an elementary school in Amsterdam. She has experience in teaching different age groups. However, this interview was focused on children in group four of the Dutch Educational system, these pupils are seven to eight years old. Therefore, the insights of this interview function as the lower limit of the abilities of children's thinking. Please refer to Appendix A.3 for the exact setup and details of this interview and the participant.

The participant was prepared for the interview by receiving the main question a few days before the interview took place. The main question was 'What methods do you use in your daily work regarding asking for feedback?' In this way, she was asked to already think about examples related to getting feedback from pupils in her day-to-day work. The interview itself consisted of a semi-structured approach and a pre-determined set of questions.

The interview resulted in five boundary conditions regarding to the design. Additionally, the interview gave insights on what works and what does not work when asking for feedback, see Figure 21 on page 52.

"Reflecteren is heel belangrijk in het moderne onderwijs. Als een kind iets heeft gepresenteerd, dan vraag ik altijd om tips en tops. Die termen kennen eigenlijk alle basisschoolleerlingen wel gok ik."

In the modern primary education, teachers do ask feedback from their pupils, especially related to their own performance or the performance of their peers. When asking feedback about the performance of the teacher, pupils always list positive points. This is very difficult for them at this age. The associated terms, used in primary education, are 'tips' and 'tops'. The pupils learn that the 'tops' need to be mentioned before the 'tips'.

"Ik merk wel dat je dat heel erg met ze moet oefenen. Heel vaak is de eerste top: "Ik vind dat je het goed gedaan hebt." Dan ga ik doorvragen: wat vond je dan goed? Zeg eens specifiek wat je dan goed vond."

Children need to practise the skill of giving feedback. Besides, they need guidance, someone who can ask further about the specific aspects and why they have this opinion. In this context of the educational field, this is done by an adult, in other words the teacher. But in the context of this project, during the museum visit, the guidance can be done by something. For example, a virtual museum employee.

"Ik doe ook weleens een tijdje 'het is verboden om te zeggen...' Bij het lezen was het bijvoorbeeld verboden om te zeggen: je hebt goed gelezen. Dan gaan ze heel diep nadenken wat ze dan goed vinden. 'Je praat duidelijk' komt er dan uiteindelijk uit."

Another tool to get more specific feedback, is to make use of forbidden sentences or words. In this way children will think further than initially intended. Sometimes the classroom is used in a tool, as a context for giving feedback. Each corner connects to a certain statement and the pupils are asked to go to the corner of their preference. The chosen tool is dependent on age and cognitive skills of the pupils. An eight-year-old is not able to write a letter for example. Since he is still learning how to read and write technically.

To summarize, the participant gave five criteria in order to get constructive feedback in the school context. These criteria are shown in Figure 21.

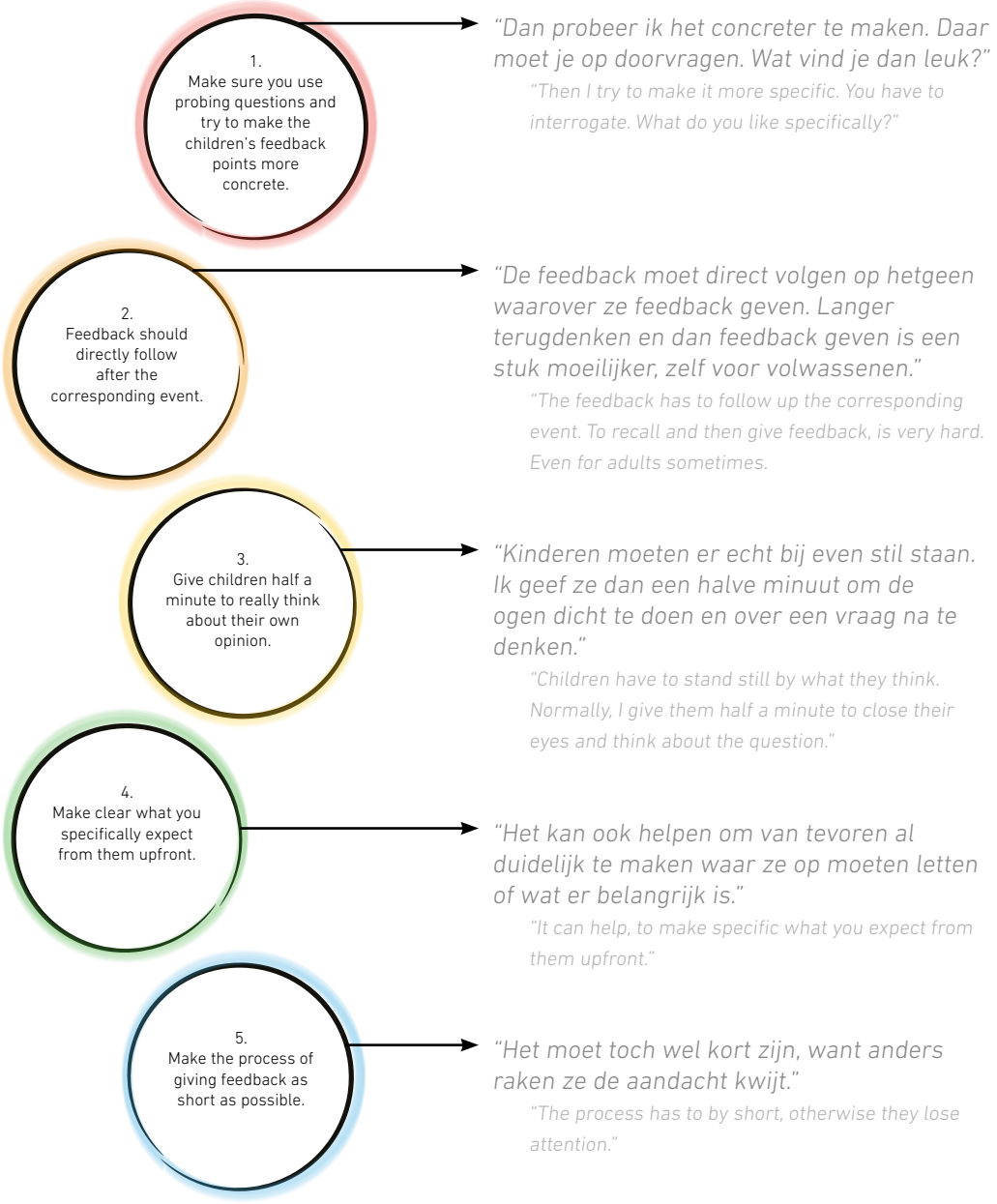


Figure 21 Insights from teacher with corresponding quotes

5.C Methods for getting feedback from children

This paragraph shows some methods for getting feedback in education. More detailed information about these methods can be found in Appendix A.6. The methods focus on getting feedback from pupils in primary and secondary education.

Firstly, a method was studied, which can be used in the upper classes in primary schools. The method is called Return to Sender and is developed by Vergunst, Versteeg and van der Kooi (2014). This method proves that children, aged elf or twelve, can provide teachers with written feedback. Furthermore, we can learn from the importance of delimiting the subject and the importance of practicing giving feedback for children. Additionally, the method shows the importance of returning what you will do with the feedback to children. However, this context is very different than the museum context of this project. Again, the role of the teacher is very different.

A downside of this method is the limited amount of input from children. The letter is literally a list that needs to be filled in. In other words, it is very familiar to a questionnaire. Firstly, the pupil does not get something out of this process. Secondly, the limited amount of input from the pupil leads to minimal psychological ownership. That is the emotional attachment to the problem. It is said that psychological ownership enlarges people's involvement or commitment (van Rijn & Stapper, 2008). Therefore, a loack of it can lead to early boredom from the pupil.

Two other methods, respectively 'Interpersonal Teacher-behaviour Questionnaire' and 'Feedbackscan' (Hoeberichts & van Dijck, 2014), were studied as well. These methods are an added value to a teacher. Because the teacher can learn from the results that are collected. However, there is no added value to the pupil. The pupil does not learn anything from this process. This is a very big downside of these methods. The own input is limited and the process boring for them. Note that this context is different than the context of this project. Still, these insights are relevant to take them into account while designing a tool to collect feedback.

5.D Ideal feedback in this project

So how does the ideal feedback from children look like? Based on the content of current chapter, the ideal feedback that children provide contains three factors. First the object needs to be clarified. Second, this object needs to be connected to a value judgement. Last, elements that make children feel like the value judgement need to be revealed. This is called the 'why'. This 'ideal feedback' is summarized in Figure 22.

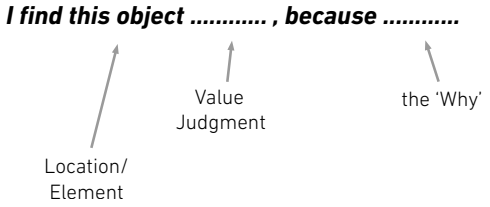


Figure 22 An example sentence of ideal feedback.

6.

Design Vision

6.A Introduction

All the insights from the research lead to a design vision in order to set the boundaries for the design challenge. All insights were clustered to comprehend the bigger issue in this project. After clustering the insights (synthesis), a design goal was stated (Section 6.C). From the key insights of each chapter a list of requirements and wishes was made (Section 6.C). The interactions were described by interation visions.

6.B Design Goal

The following design goal derived from the synthesis phase:

Design a tool that enables children to give their opinion about their museum experience [1], and provides museum educators with inspiring feedback that can lead to concrete steps for improving the museum experience of children [2].

The numbers in this goal correspond with the numbered arrows, which are shown in Figure 34. As mentioned before, this design goals focuses for this stage in the project only on the first step in the roadmap, where the tool aligns with a contributory project describe by Nina Simon. Secondly, this tool should be suitable for all personas, who are described in Section 3.C.

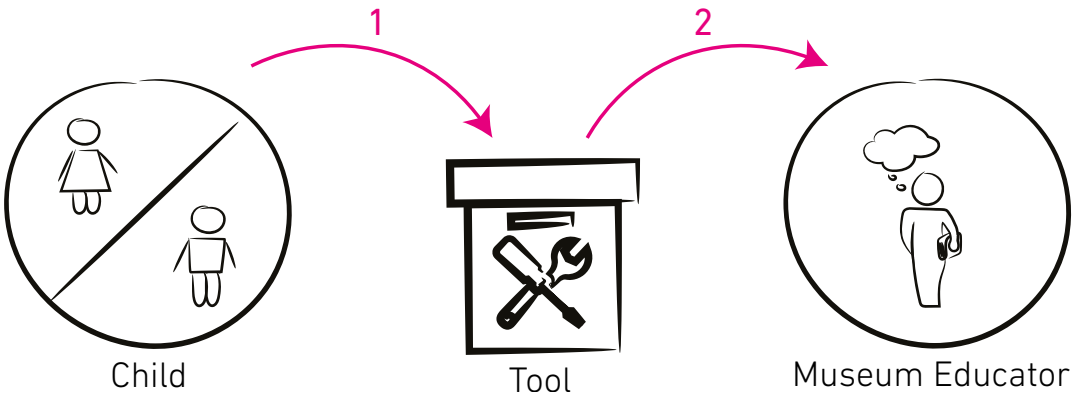


Figure 23 The two steps in the design goal

6.C List of requirements and wishes

In order to create a framework, where the tool fits in, a list of requirements and wishes was made. This list is shown in Figure 26.

Note that this list is not made in one time. This is adapted during the design process, because every step revealed another requirement. To achieve this list, a few iterations were needed. Please refer to Chapter 7.B to see how this process looked like.

The colours refer to the importance of the criterium. A five-point scale was introduced. Red refers to the weighing of five (very important criterium). On the other hand, blue refers to the weighing of one (least important wish). Note that red, orange and yellow criteria are requirements. Green and blue criteria are wishes.

Figure 24 List of Requirements and Wishes

"Explaining a **classmate,** who is a direct **friend**, the **mathematics exercise** you just finished."

Qualities of Interaction	*Design Features*	*Interaction Qualities*
Challenging	Mathematics exercise	Stepwise
Rewarding	Explanation helped your friend	Apparent
Explorative	Friend asks for more clarification	Approximate
Excited	Smile on both faces	Gentle

Figure 26 Interaction Vision for child

"Getting the final hint during **a scouting expedition** and **understand** where the **end-location** should be."

Qualities of Interaction	*Design Features*	*Interaction Qualities*
Inspring	The clothes of informer	Covered
Understanding	Content of final hint	Targeted
Decisive	Clarity of explanation of informer	Uniform
Amazed	Learning aspect	Stepwise

Figure 25 Interaction Vision for Museum Educator

6.D Interaction Vision

As described in Figure 25, this tool serves two stakeholders. However, each stakeholder needs his own interaction vision, because the interaction with the tool is totally differen. Interaction visions can be explained by framing an analogy that shows how the interaction with the tool should feel like. The interaction with the tool for the child is on a very different level, compared to the museum educator who will use the tool after the feedback is collected.

Firstly, the interaction vision for the child is formulated. The interaction with the tool should feel like:

> *"Explaining a classmate, who is a direct friend, the mathematics exercise you just finished."*

In other words: you want to explain the exercise, since this classmate is your friend. You want to help out and benefit from it yourself as well, by feeling appreciated and helpful. A very important aspect of this vision, is the equivalent interaction which takes place. The mathematics exercise stands for a challenging assignment, namely giving feedback about the museum experience. However, when the assignment is finished, this always leads to a satisfied feeling. The interaction vision is visualised in Figure 27.

Secondly, the interaction vision for the museum educator is formulated as well. The interaction with the tool should feel like:

> *"Getting the final hint during a scouting expedition and understand where the end-location should be."*

This vision represents an exciting activity for the museum educator, like a scouting expedition. When reading the content, the educator can explore and understand the feedback and knows where to go next. The end-location in this analogy represents the higher goal of this project, a better museum experience for children. The interaction vision is visualised in Figure 28.

6.E Conclusion

Based on the outcomes of the literature study and field study, a clear vision on the focus of the project is set. This will lead to concrete steps in the conceptualisation phase.

This vision functioned as a base for the design process of the feedback tool. This vision clearly helped to set boundaries during the ideation phase. Furthermore, the ideas were tested to see if they matched the requirements.

KEY INSIGHTS

During the conceptualisation phase it became clear the following method works best for letting children provide constructive feedback to museums. The method can be found in Figure 35.

The choice was made to prefer the digital prototype over the physical prototype, because of feasibility issues.

The choice was made to work with spoken feedback. A downside is that it takes more effort for the museum educator to process the feedback. However, children will give more insights into the why behind their opinion.

No difference was in formulating different questions about the why. Therefore, multiple types of question can be asked based on the insights from Chapter 5.

7.

Conceptualisation

7.A Introduction

Previous chapter showed the boundaries for the eventual design. The current chapter shows the process from design brief to detailing the concept. An overview of the conceptualisation process is visualisued in Figure 29.

From the ideation phase, four different concept directions derived. A test was needed to find out which of the concept directions was the most promising. After analysing results, one direction is chosen to make further iterations. Two variations of the chosen concept direction were made and both were tested as well. The two evaluation steps led to the final concept, which is shown in the next chapter.

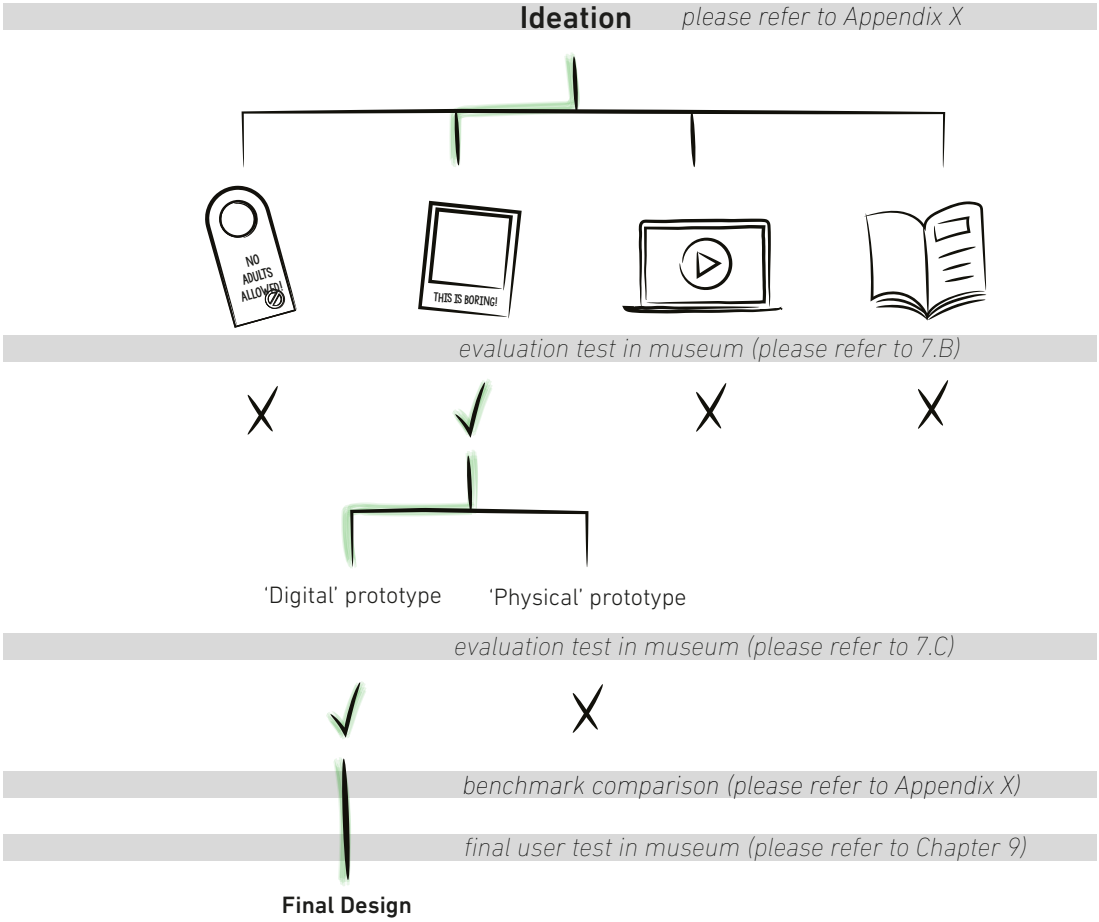


Figure 27 Structure of current chapter

7.B Evaluation of Concept Directions

Four Directions

A morphological chart was made at the end of the ideation phase (please refer to Appendix B.1). This chart led to four concept directions, each with different key aspects. These directions are illustrated on this page.

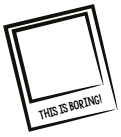


Photo Hunt + interview afterwards

Concept 1

First direction is a Photo Hunt during the museum visit. Children can take pictures with a picture frame in front of the camera. On this frame, a value judgement is shown. For example, 'this is boring!'. In this way, children make a combination of a value judgement, different from the word 'fun' ("leuk" in Dutch), and an object in the museum. An interview afterwards serves to reveal why the child finds this particular object boring.

Secret Feedback Room only for Inspecors

Concept 2

The second concept direction is a 'secret' feedback room, which is only accessible to children. In this room, children can watch a movie of statements of other children about their museum experience. Afterward, the child can choose if he or she agrees or disagrees and how they differ in their opinion. From the outside children already see different statements other children have made, which makes them sensitive for their role as inspector.

Application about 'How to make a vlog?'

Concept 3

Third concept direction is an application for a mobile phone that can be designed and learn to children how to make a proper vlog (i.e. video blog). In this way, children are not aware that they give feedback about their museum visit. As a matter of fact, they share all types of information about their experience. An educator can see where they have been and find out about their favourite spots.

"Wrech this Journal" booklet

Concept 4

The fourth and last concept direction, was a "Wreck this journal" type of booklet. According to the writer, Wreck This Journal is *a subversive illustrated book that challenges readers to muster up their best mistake- and mess-making abilities to fill the pages of the book—or destroy them.* In this booklet, several surprising assignments can be found. Children are addressed on multiple intelligences, e.g. drawing, searching, writing. More information about multiple intelligences is addressed in Apppendix A.6.

More in depth details about these directions, can be found in the sketched scenarios in Appendix B.2.

First evaluation - Method

The goal of this first evaluation was to find the most promising concept direction. In this section, the research questions and setup of the first evaluation are described.

Research Questions

- Which concept direction is most feasible to complete for families with child(ren) in the age range from nine to twelve during a museum visit?
- Which concept direction delivers most constructive and inspiring feedback for the museum from child(ren) in the age range from nine to twelve?
- Which concept direction is the best addition to the museum experience according to families with child(ren) in the age range from nine to twelve?

Setup

Each participant only tested one aspect per concept direction. The tested aspects were the ones that distinguished the concept direction from the other ones. In other words, that aspect stood out and was distinctive for the concept direction.Figure 31 explains what element has been tested per direction.

This means the test was a within-subject design (Greenwald, 1976). All participants are exposed to the four conditions. In this case, the slimmed-down form of the four concept-directions.

These elements were combined in a booklet with assignments the participants were asked to execute during their museum visit. The content of this booklet can be found in Appendix B.3. With the booklet, the participants got a package with tools and items that were needed for executing the assignments. This package is shown in Figure 30.

Participants

The test was carried out in Museum Prinsenhof Delft and Science Centre Delft. Only families with children in the age range from nine to twelve could participate and with a maximum of two children. Because otherwise, there were too many interactions with each other. That would probably result in not filling out the booklet.

Analysis

The results were analysed per participant, because every participant tested the four different directions in a slimmed-down form. These results arose from observations by the researcher and the results that were filled out in the booklet by the participants. However, only two participants were able to fill in all the assignments, therefore only these results could be used to understand if the feedback was constructive.

Figure 28 Used prototype in Evaluation 1

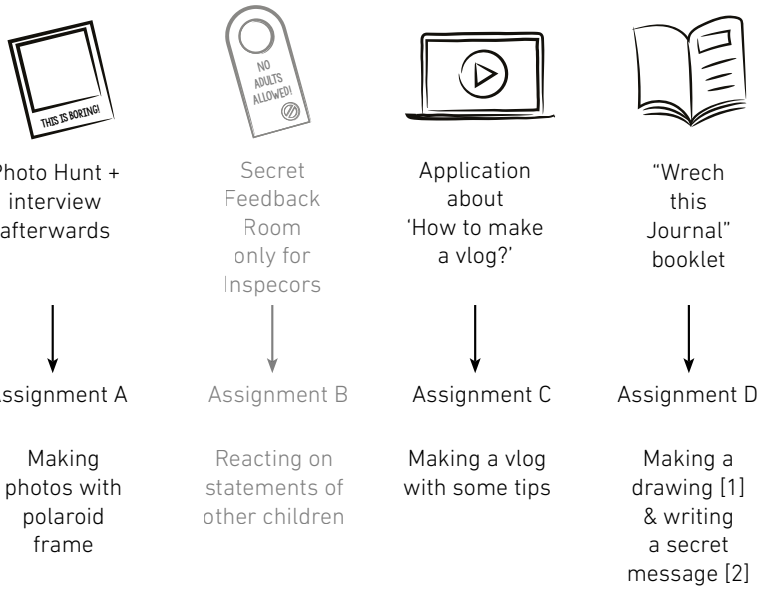


Figure 29 Tested elements in this first evaluation

All results were discussed during an expert meeting of the Museum Futures Lab. In this expert meeting, several museum educators and designers from the field were able to give their perspective on the collected feedback. In this meeting, it was decided to neglect results from assignment B, because the statements were too directive for children.

This implicates that the corresponding concept direction is eliminated from further development as well. The secret feedback room still can be interesting for letting children provide feedback. However, the usage of leading statements cannot be used, because children will only react to the statement. Then children are not triggered by their own opinion.

The results that are shown in the next paragraph, will show the found feedback compared and measured to the 'ideal' feedback that is stated in Figure Figure 32.

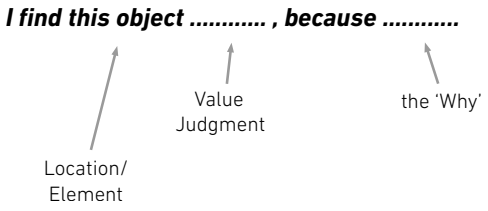
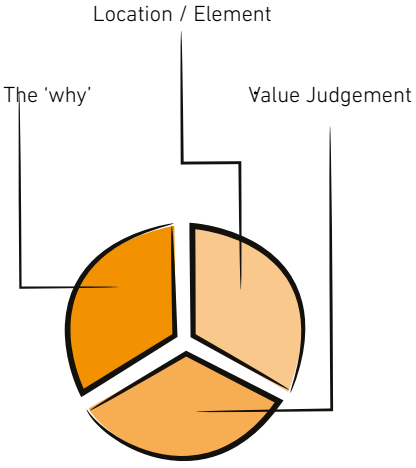


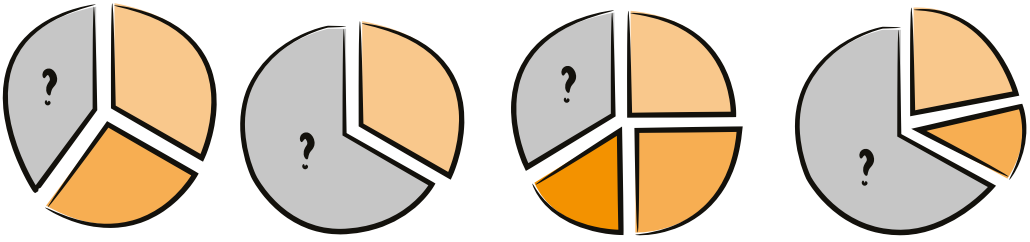
Figure 30 An example sentence of how ideal feedback looks like.

Figure 32 shows the feasibility of completing an assignment. The tool was given to six families. 'N' is the number of families, that were able to fulfill an assignment. This means the lower 'n' is, the more difficult it was to complete the assignment. Additionally, Figure 32 shows how constructive the collected feedback was. The most important insight of this test, was notably the collected feedback measured to and compared with the 'ideal' feedback. For example, if the feedback was hundred percent clear, the circle should be totally orange in three equal divided parts, that correspond with the three elements ideal feedback should contain. The grey part of the circle refers to the unknown information of the feedback. In other words, grey means the feedback does not match with the established criteria. As Figure 32 shows, the drawing and vlog did not reveal much information about the opinion of the child. The secret message and photo hunt were more constructive. The secret message even showed us 'the why' of the opinion, whereas the photo hunt did not reveal the why at all.

Lastly it was tested if the assignments were an pleasant addition to the museum experience. The results are displayed in Figure 30. Minimal differences are shown on the likeness of the different assignments according to the child participants. There is no clear opinion about the interaction quality 'exciting' ('spannend' in Dutch). While observing and questioning the participants, it became clear the children were excited in all three cases.



Example of how the result of ideal feedback should look like



Assignment A
Photo Hunt
(n = 4)

Assignment C
Vlog
(n = 2)

Assignment D1
Secret message
(n = 4)

Assignment D2
Drawing
(n = 3)

Figure 31 Results on constructive aspects of the collected feedback Note that assignment A en D1 score the best because these results reveal the most compared to the ideal feedback in the upper graph.

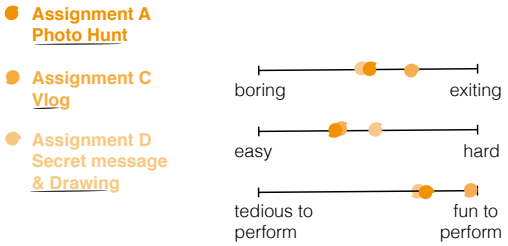


Figure 32 Results of 'likeness' of concept directions

For example, two sisters convinced their grandmother of doing another assignment:

"Oh nee, we moeten deze opdracht nog doen hoor oma! Mogen we deze nog even uitvoeren?"

"Oh no, we still have to fulfil this assignment! Please let us perform this last one, grandma."

The parents after the assignments, showed that they were enthusiastic about the tool as well. This is shown in the next quote:

"Onze kinderen keken nu anders naar het museum. Misschien dat ze de volgende keer ook wel anders kijken."

"Our children wachted differently. Maybe that they will watch differently next museum visit as well."

After the test, the concept directions were evaluated through the weighted criteria method (van Boeijen, 2014). Like previously mentioned in Section 6.C the pre-defined criteria already got a weight factor in order to prioritize requirements and wishes. The results of this test determined to what extent the concept direction matched with each criterion. In Table 4 this is shown by giving each criterion a number between one and five for each concept directions. As can be seen in Table 4, concept 1 (Photo Hunt) is the most promising concept.

Criteria *[Source]*	**Weight**	**Concept 1**	**Concept 3**	**Concept 4**
R1. The tool should function next to current museum inspector platform, and the tool should not be a replacement for this current platform. *[Museum association; chapter 1]*	5	5	5	5
R2. The tool should enable children to give constructive inspiring feedback with it. *[Assignment; chapter 1]*	5	3	2	3
R3. Every child in the age range from nine to twelve should be albe to execute the assignments in the tool, with limited help of adults. *[Interview with teacher; chapter 5]*	5	5	2	4
R4. The tool should enable children to express their real opinion as best as possible, therefore the assignments/questions must not be leading. *[Interviews with children; chapter 2]*	5	3	3	4
R5. The tool should facilitate the museum educator comprehend what the child means with his feedback. *[Assignment; chapter 1]*	5	3	3	3
R6. The tool is an added value to the museum visit. So when using the tool, children and their parents should be visibly enjoyed. *[Downside of feedback tools used in education; chapter 5]*	4	5	3	5
R7. Processing the feedback from the tool should fit in the day-to-day work and activities of the museum educator. *[Interviews with educators; chapter 3]*	4	5	4	3
R8. The generated feedback should lend itself for generating new ideas and for being translated into new ideas by the museum educator. *[Assignment; chapter 1]*	4	1	1	1
R9. The chance of influenced feedback by the parents should be as little as possible. *[Interview with parent; chapter 2]*	3	4	3	3
R10. The feeling of psychological ownership should derive while children make use of the tool. *[Downside of feedback tools used in education; chapter 5]*	3	5	5	5
W1. The investment costs of this tool should be as low as possible.	2	3	4	5
W2. Preferably children do not immediately realise that they give feedback about their museum experience. *[*	2	5	5	4
W3. The tool should limit the feeling of authority difference for the child, so an equal interaction originates between educator and child.	2	3	5	4
W4. The museum educator can have an influence on the type of feedback up front.	1	5	5	5
W5. The tool enables the museum educator to feed back changes that were being made to the children who used the tool.	1	5	5	5
		3,9	**3,3**	**3,5**

Table 4 List of Requirements and Wishes

Conclusion of first evaluation

From this test and the weighted criteria method, two promising concept directions were found. The photo hunt and the secret message in a bottle were found to match the criteria best.

The other two directions eliminated from further development. Firstly, because leading statements do not work for children. Making use of other children's statements will result in children who not think about their own opinion anymore. Secondly, asking children to make a vlog can result in unfulfillment of the assignment. Because standing in front of a camera is too frightening for them. Therefore, the concept directions 'feedback room' and 'how to make a vlog?' shall not further be developed.

Besides, combining aspects of the chosen concept directions lead to a method for collecting constructive feedback. The photo hunt assignment showed the potential of combining a specific object with a pre-defined value statement. The secret message showed the potential of the option to fill out the why behind their opinion. The combination of these insights led to a method that was used in further development of the tool. When children are triggered by a museum object, they make a combination of the object and a corresponding value judgment. After this decision, a supplementary question can reveal the why behind their opinion. The described method is visualised in Figure Figure 35.

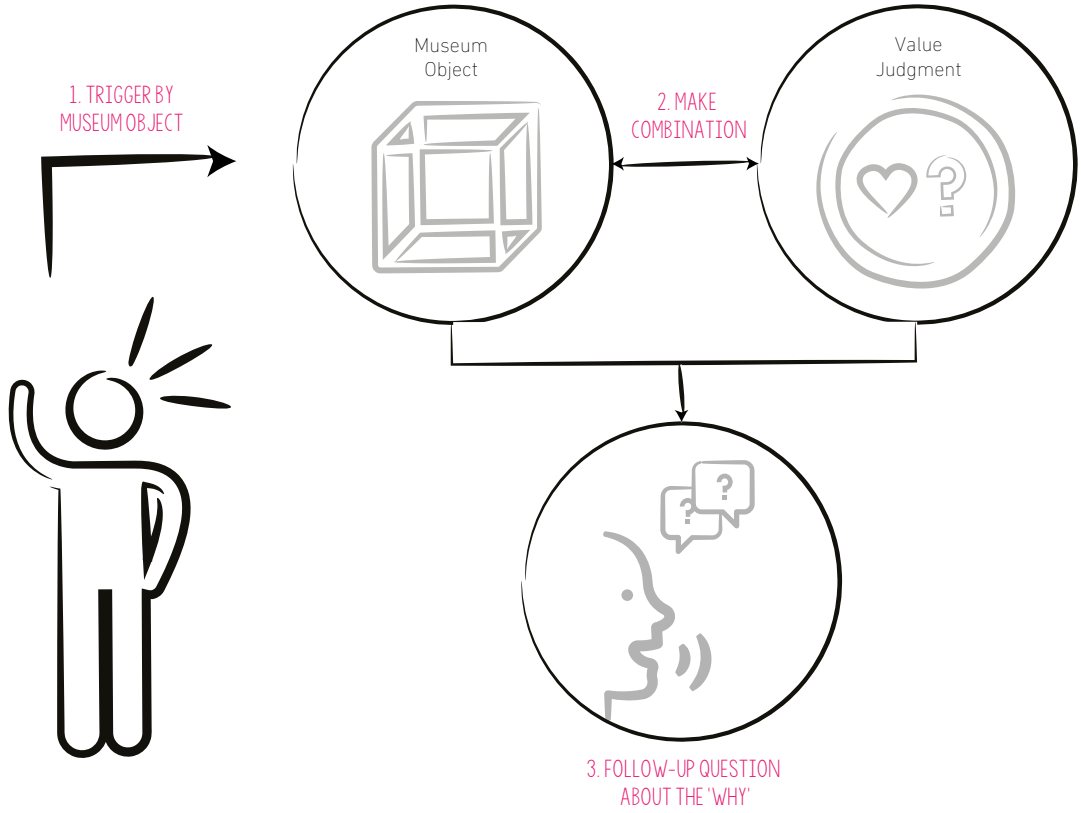


Figure 33 Method that was proven to work as a structured way of letting children provide constructive feedback

7.C Detailing of chosen concept direction

Concept variations

From the conclusions of the previous section a new iteration phase started. Two concept variation derived from the insights of the previous chapter. The distinguishing aspect of these variations was whether the concept need to be digital of physical. In the digital concept, an iPad was used to collect the feedback from children. The physical concept worked with an instant camera in combination with stickers.

Please refer to Appendix B.5, for more detailed information of the two concept variations. The detailed information consists of two scenarios.

Second Evaluation

To make a substantiated choice of the two concept variations, a second evaluation with children in museums was needed. The evaluation consisted of two different tests. In this section, the setup and results of test A and B will be discussed. Test A focused on observing the difference between the use of an instant camera comparted to an iPad.

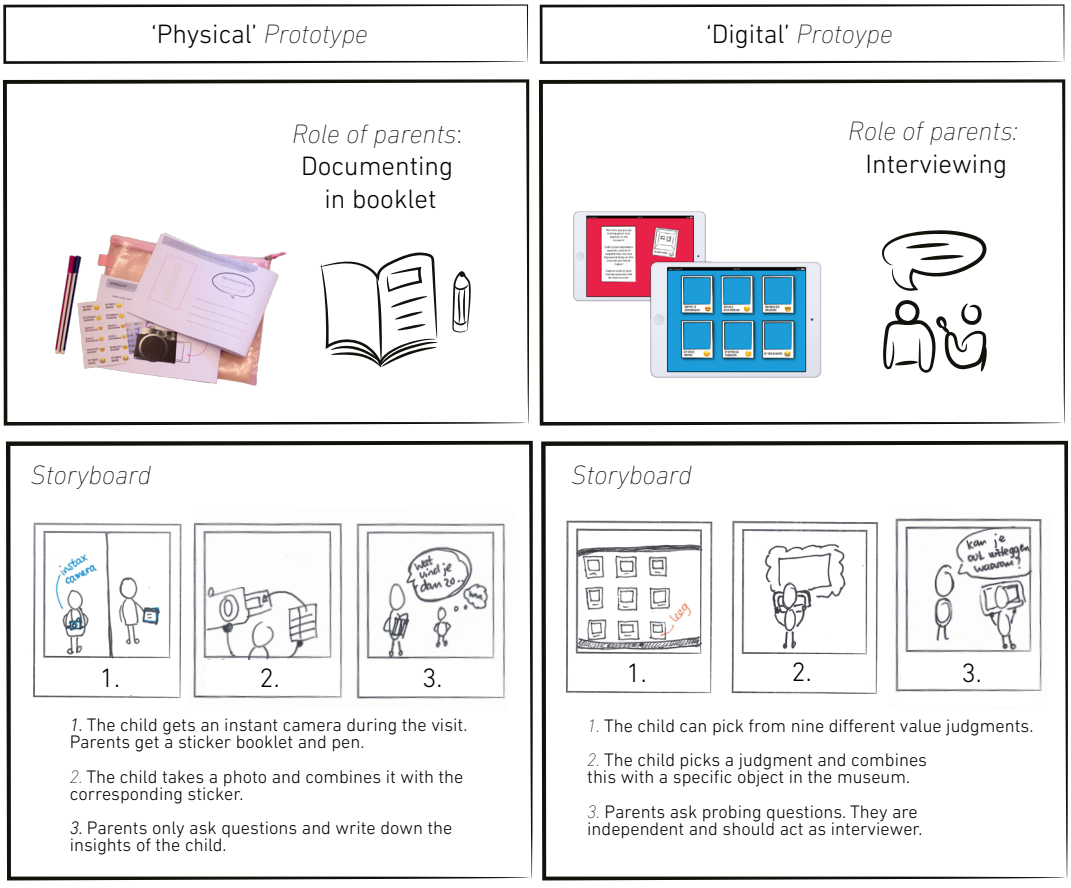


Figure 34 The difference between the two prototypes used in test A.

Test B focused on finding the difference between spoken and written feedback because the way of providing feedback is a distinguishing factor in the two concept variations.

For both Test A and B, the participants were selected after buying their ticket for Science Centre Delft. Only families with children in the age range from eight to twelve could participate and with a maximum of two children. Because otherwise, there were too many interactions with each other. That would probably influence the observations.

Test A

The goal of this second evaluation, part A, was to observe the difference of using two different types of probe. The two different probes were an iPad and an instant camera. Furthermore, the two concept variations also had a different role for the parents. In the digital concept the parents had an interviewing role, whereas

in the physical concept the parents had a documenting role. The assumption was that when giving parents their own role, they should have less influence on the content of the feedback. In the next section, the research questions and the setup are desribed.

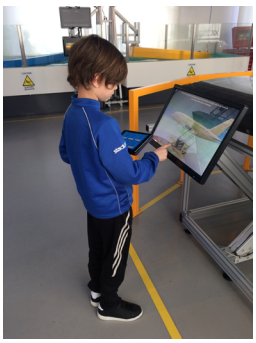


Figure 35 Participant using the digital prototype

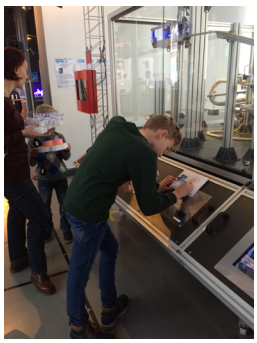


Figure 36 Participant using the camera prototype

Method

Research Questions

- Which concept variation contains the best role for parents to limit the influence of parents on the content of the feedback?
- Which concept variation is most feasible in completing the tasks for families with child(ren) in the age range from nine to twelve during their museum visit?

Setup

Two prototypes have been made for this test. One prototype consisted of an instant camera, with stickers and a booklet. The other prototype, consisted a specially designed application. The two prototypes and corresponding storyboard are shown in Figure 37. Furthermore, this Figure explains the different roles of parents in the two prototypes. The exact content of the physical and digital prototype can be found in Appendix B.6.

The prototypes have been tested across participant, which means a participant got one of the two prototypes during the test.

The results were gathered by observing the participants during their visit. These results are shown in the next paragraph. During the test, one co-researcher was instructed to do the observations. So the researcher herself could approach potential participants. This was done, so children would not notice they were being observed by the designer of the test.

Results

In Figure 37 and Figure 38 the setting is displayed. In Figure 39 two examples of the feedback that was generated with the physical prototype are shown.

What worked well?

- The child held the camera with him all time, because it hung around his neck.

- The interview role of the parents, made the partent "help" with their opinion. Unfortunately, the big downside of this role, is the possibility that parents pose directive questions.

What did not work well?

- The stickers went missing after only five minutes. This is an important factor to choose for the other digital concept. When asking the child to tell what sticker was used, he answered with 'fun'. In this way, the value judgement is less specific and less usable.

- The documentation role for the parents failed. It turned out that the opinion of grandfather was written down. Grandfather implied that his grandson liked the superconductivity train. His grandson made the picture, but no discussion aroused about the why. The child is focussing on another object from the exhibition already.

Discussion

The results were very convincing to choose for the digital concept. However, there were not many participants available in the museum during the test. Because the results were so obvious, the number of participants was not extended.

Test B

This test contained to goals. Firstly, the goal was to find the influence on the constructively feedback from spoken or written feedback. Secondly, the influence different formulated question to understand the why part that is needed for qualitative feedback was researched.

Method

Research Questions

- What is the difference between spoken feedback and written feedback, on the constructively part of feedback?

- What is the difference between two different fomulated questions, on the constructively part of feedback?

Setup

The test was a within-subject design (Greenwald, 1976). All participants were exposed to the four different assignments. In Table 5 the differences are shown. For this test one prototype was made. The prototype consisted of a booklet with four assignments, a voice recorder and a pen, see Figure 39. The order of assignments was interchanged, in order to eliminate the learning effect of giving feedback. The exact content of the booklet can be found in Appendix B.7. This prototype was tested within participant.

Spoken Feedback	Written Feedback	
Assignment 1	Assignment 3	Probing question like "What do you find specifically irritating?"
Assignment 2	Assignment 4	Appoint a 'tip' or 'top' of this element

Table 5 The four assignments explained

Figure 37 Prototype of Test B

The used method, within participant, made it necessary to analyse and compare the results per participant. The results derived from what they have written down in the booklet and what they recorded with the voice-recorder. Since only two participants completed the four assignments, only their results were useable during the analysis.

Results

In Figure 40 the results of four different assignments are shown from one participant.

There is a clear difference when comparing the spoken feedback to the written feedback. When listening to the spoken feedback, this feedback comes more to life and it acts to a person's imagination. Furthermore, it is easier for the child to add another thought to the feedback. Therefore, the spoken feedback has more aspects of qualitative feedback and fulfills more the criteria of constructive feedback.

No clear difference was found for the two types of question. Therefore, both type of questions can be used in the application. An added benefit is that no drudgery will arise and a more lively discussion can start. However, the question that will be used should be verified and based on the insights from Chapter 6.

Discussion

The participants that completed all the assignments were on average younger than the target group. The results are from children of 7, 8 and 10 years old.

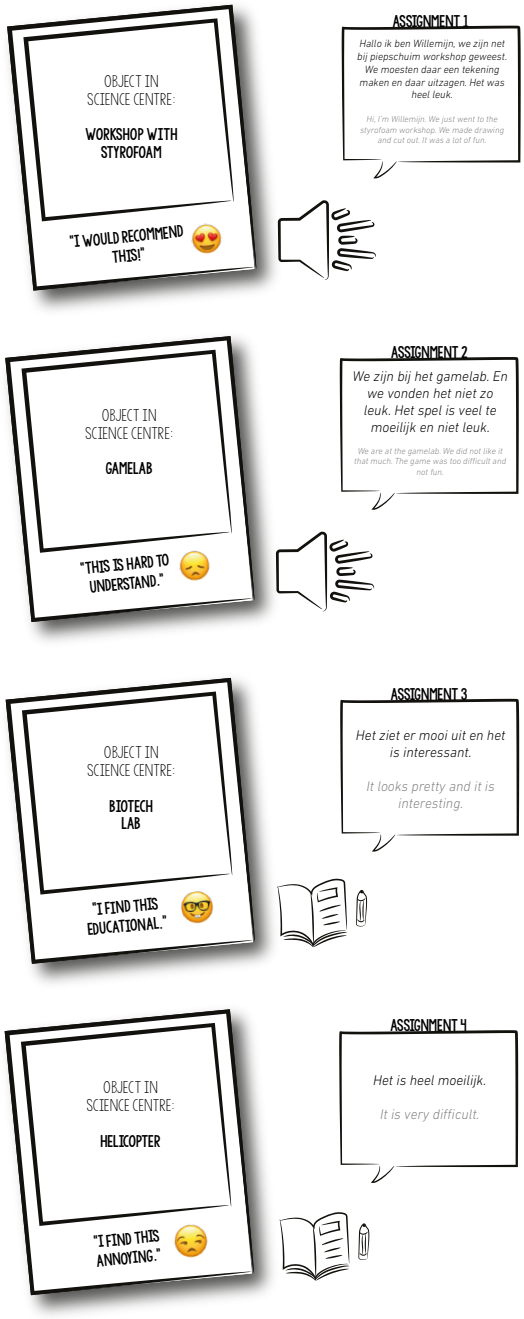


Figure 38 Results from participant 2 of test B

Conclusion of second evaluation

From this second evaluation, including insights from test A and B, the following statements need to be incorporated:

- The design should be digital, because than children only need one hand. Which is convenient, especially in a 'do' museum.

- Children should feel responsible about the feedback. Therefore, the parents do not get a role at all.

- Because psychological ownership enlarges children's commitment, children get a phone hung around their neck. Therefore, a silicone shell and lanyard is needed. Additionally, this can decrease the influence of parents.

- Spoken feedback will be used in the application. Children can easily tell to the application why they have this specific opinion. An additional benefit of spoken feedback is that during processing, museum educators can hear if the feedback is influenced by parents.

- From test A we concluded the parent's role as interviewers worked quite well. Downside was the influence of the parent. Therefore, an independent virtual employee can be introduced in the application, to ask the questions.

- Different types of questions will be used, so it does not get boring to answer these questions.

8.

Final Design

8.A Introduction

In this chapter, the final design of the tool is shown. The goal of this project was to design a tool that could collect constructive and inspiring feedback from children about their museum experience. Therefore, the MuseumMakers tool was created. This tool is an application that can be used during the museum visit. The collected feedback should be processed by the employees of the museum. A vision on how the feedback should be processed by the museum educator is also shown in the current chapter.

8.B MUSEUM MAKERS

MuseumMakers is a digital application that can be used by children during a museum visit. The fundament of the application is laid by the model which is previously explained in Section 7.B. This model ensures children to give feedback in a structured and constructive way. While using the application a virtual museum employee interacts with children. She explains how the children can give their opinion and she provides an example of constructive feedback. This example contains how the 'why' can be explained. The process of giving feedback is visualised in the flowchart of Figure 41. The parts where the virtual museum employee takes part have a yellow background.

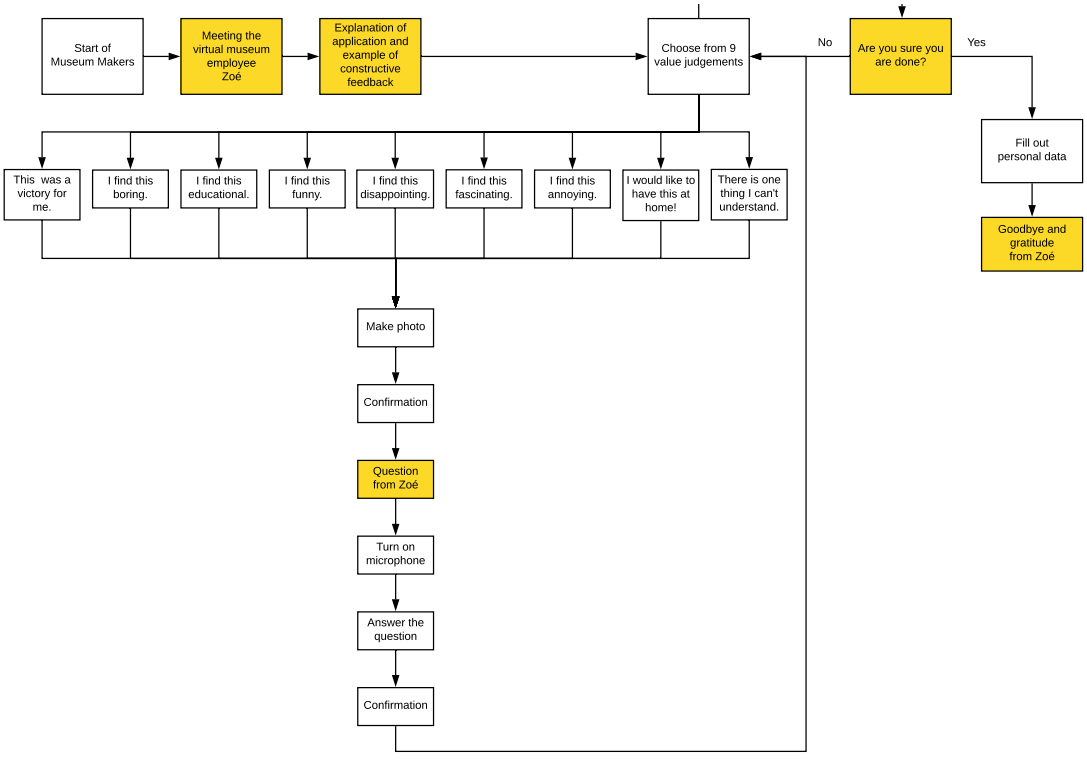


Figure 39 Flowchart of the MuseumMakers application

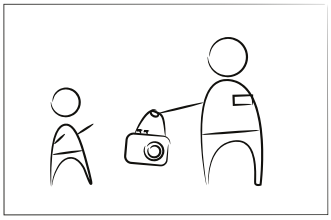
8.C Scenario of collecting feedback

In order to get a better understanding of the usage of the application, a scenario of use is shown in Figure 42. This scenario provides more information about how the museum visit journey appears to be for children that participate with Museum Makers.

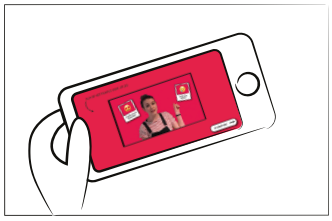
The scenario focusses on one feedback loop. However, multiple feedback loops can be made during the museum visit.

When children choose a statement more than once during their visit, the tool should provide an option to rate these moments at the end. For example, when the statement 'I find this annoying' is used three times; children should indicate which object was most annoying and which object was least annoying. Unfortunately, it was not feasible to include this option in the prototype due to technical limitations.

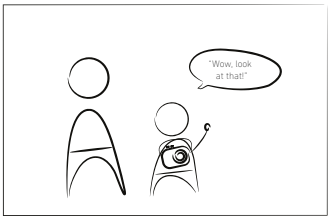
1. Register together with parents



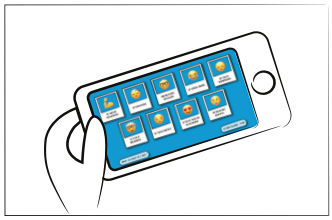
2. Hand over MuseumMakers smartphone by employee



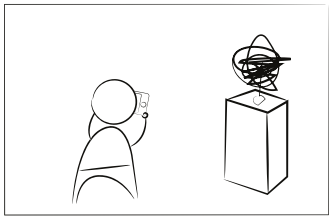
3. Explenation by Zoé (virtual museum employee)



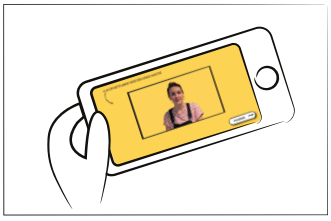
4. Trigger by object during museum visit



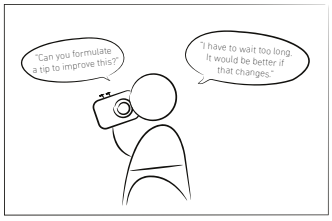
5. Choose value judgment



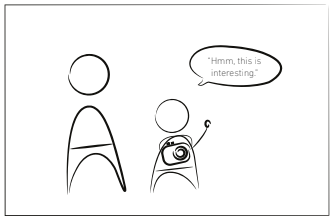
6. Make picture of object



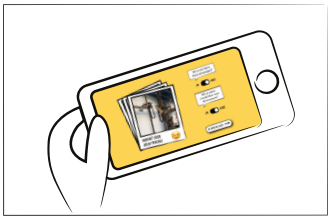
7. Listen to question from Zoé



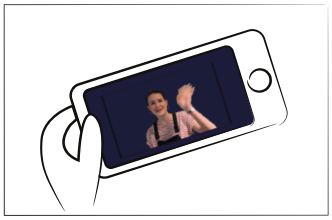
8. Answer question by voice recording



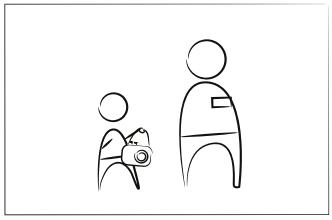
9. Discover next object



10. At the end of visit: fill out personal details



11. Goodbye from Zoé



12. Hand in Museum Makers smartphone

Figure 40 Scenario of usage

At first, the family needs to be prepared for the special feedback visit. This can be done by making a registration form on the MuseumKids website. On this website, a movie should be visible that shows the interactions with the application and gives examples of feedback. In this way, the child is made sensitive to the tasks that he or she shall perform during their visit. Due to privacy issues of children, the parents have to sign an informed consent during the registration. In this way, the museums can use the recorded voice messages and photos children make during the museum visit. A silicone shell and lanyard are attached to the smartphone. When arriving at the entrance, the child gets the smartphone hang around his neck. Due to this action, more physical ownership will arise within the child. The smartphone is owned by the museum association because visitors are less likely to download an application on their own smartphone. While walking through the museum, the child is in the lead by having the option to choose an object or element that grabs their attention. However, when not using the smartphone at all, the child gets a reminder of the virtual museum employee after ten minutes of non-interacting. Furthermore, the same kind of reminder occurs when only negative or only positive feedback is given. This is shown in Figure 43.

Figure 41 Reminder message from Zoé. Translation: Hi! Probably you are enjoying yourself in the museum, but try not to forget to give your opinion. Thank you!

To summarise the interactions between the different stakeholders an overview was made. This overview can be found in Figure 44. In order to test the final design, a prototype was made using a Marvel application. The prototype can be found at the following link:

https://marvelapp.com/61643b6

There were some technical restraints. The prototype is not able to make real pictures or turn on the microphone. There was no option available for sending the photos to a mail address.

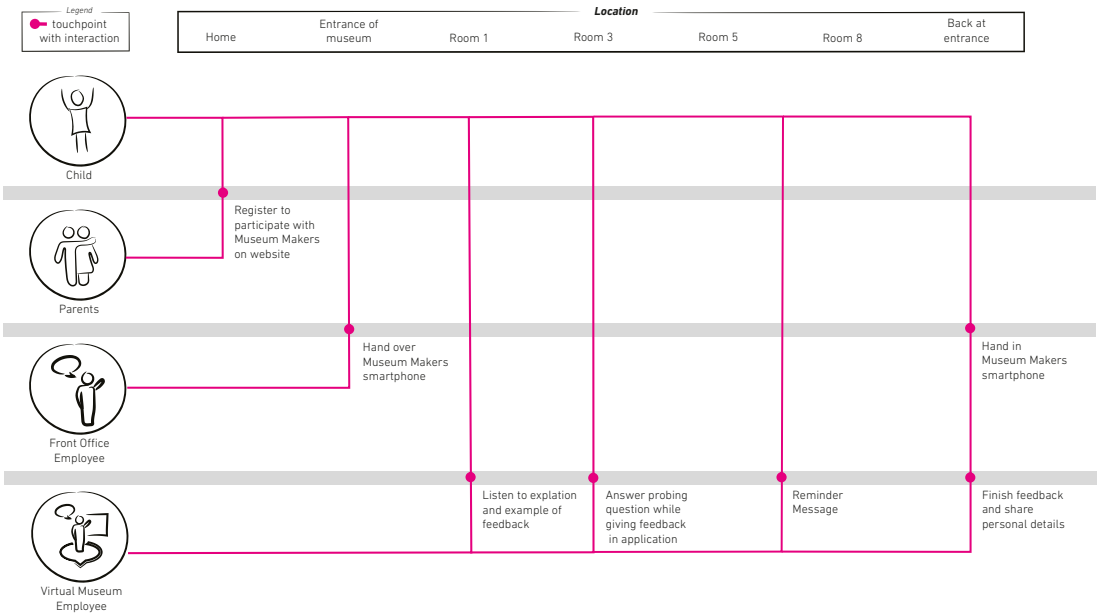


Figure 42 Interactions during usage of MuseumMakers

8.D Explanation of statements

Pieter Desmet describes 14 emotions that are often elicited by product design (Desmet, 2003). The statements in the application are based on nine of these emotions. In Figure 45 the nine chosen emotions and corresponding statements are shown. The chosen emotions are likely to occur during a museum visit. The five emotions that were not used (indignation, disgust, unpleasant surprise, admiration and pleasant surprise) are less relevant in this context. However, these emotions still occur while looking or interacting with a museum object. The reason they are eliminated, is due to the fact these emotional reactions are too similar to one of the nine chosen emotions. Overlap in the statements probably will be confusing for children while giving feedback.

8.E Explanation of question's types

To make the process of giving feedback not monotonous, the virtual museum employee asks different types of questions to discover the why behind the combination of object and value judgment. The methods behind these questions were based on the findings in Section 5.B and four different types of language-think levels by Marion Blank (Bokkem & van der Velden, 2014). More in-depth information about these levels can be found in Appendix A.6.

The questions by the virtual museum employee are phrased as follows:

- "Which specific aspect did you find ...?"
- "Can you formulate a tip to improve this?" or "Can you formulate the top aspect?"
- "How can we make it even more ... for you and your friends?"

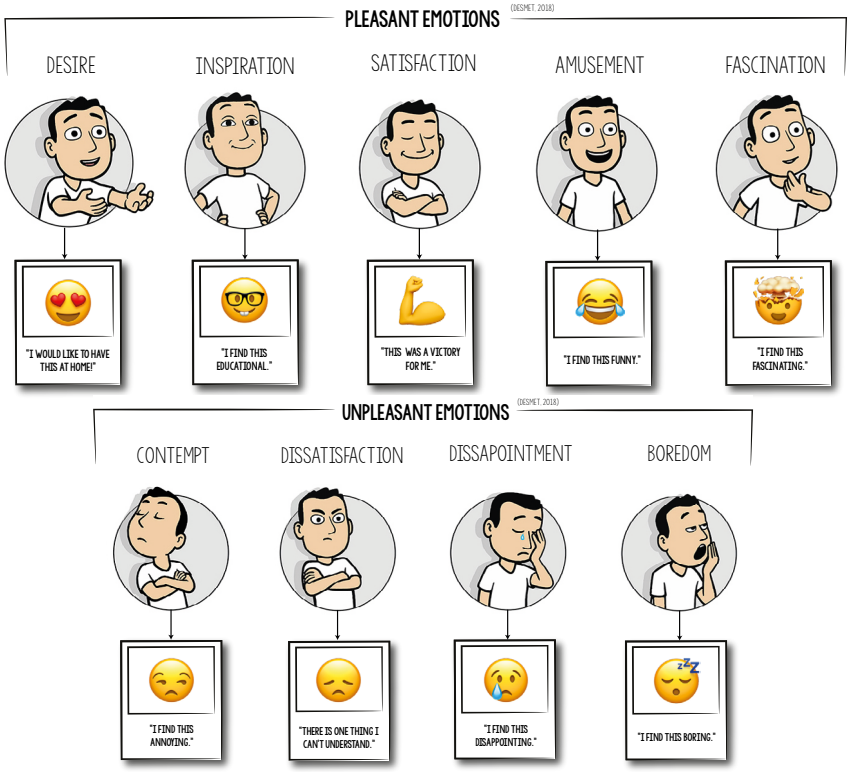


Figure 43 From emotions by Desmet to statements in the application

8.F Scenario of processing feedback

Collecting the feedback is not everything that needs to be done to improve museum experiences for children. When the feedback is collected, the museum educator has to process the collected feedback. The museum educator can decide whether they are interested in feedback from children that experience a regular visit. Since the tool is owned by the Museum Association, the tool can be booked by affiliated museums. After booking the tool, participants are needed. This can be done by recruiting in the museum itself or advertising on websites or social media. The phase of collecting feedback can start, which is already elaborate discussed in the previous section. Lastly, the collected feedback needs to be processed. On illustrative overview of these stages is shown in Figure 46.

The last stage, process feedback, is ideally done together with colleagues. By making the stage of processing feedback a joint responsibility, multiple museum employees will discover the wishes and preferences of children. Likewise, the awareness about children's preferences will rise and therewith better museum experiences for children can be created. The colleagues need to ask themselves what children mean with their feedback (paraphrasing). Than action points need to be formulated to make improve the museum experiences of children. In the next chapter, guidelines will be formulated about how museum educators would like to receive the collected feedback. This was done by means of interviews with two museum educators.

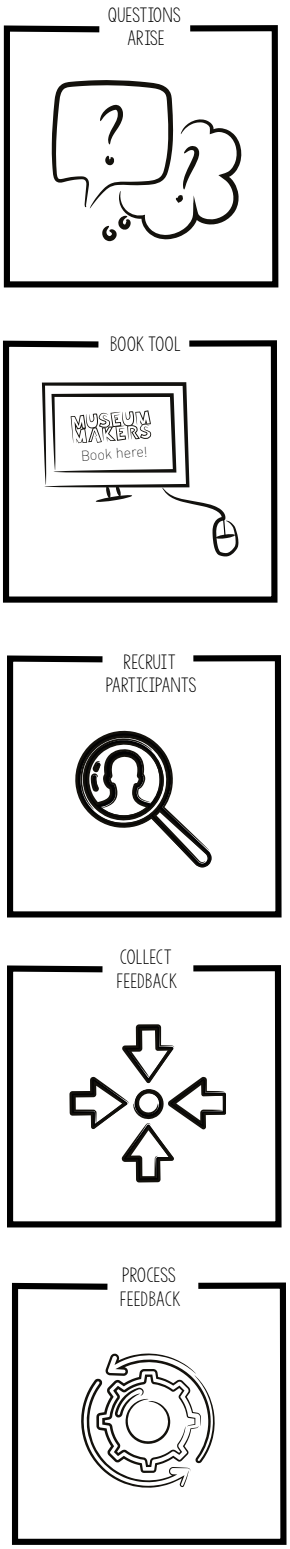


Figure 44 Scenario for museum

8.G Implementation - Financing the tool

MuseumMakers is created to serve all Dutch museums. Therefore, the museum association is likely to be responsible for the implementation of this tool. Of course, they are not responsible for all the costs. Further research and development are needed to make decisions on further implementation.

KEY INSIGHT

The design was evaluated in a user research. The research showed that the tool enables the desired result. Children were able to give constructed feedback to museum educators with the use of the application MuseumMakers.

Final Evaluation

Current chapter is divided into two parts. Firstly, this chapter will explain the validation of the final design with children. Secondly, the chapter will explain the validation of the collected feedback with museum educators.

9.A PART 1: USAGE OF MUSEUMMAKERS BY CHILDREN

A validation user test was executed to test the following goals: the most important goal is to find if the collected feedback was comparable with the ideal feedback that was stated in Chapter 6. Furthermore, the usability aspects of the application were tested and the intended interaction qualities were validated.

Research Questions

- To what extent is the collected feedback constructive?
- To what extent do children experience usability problems while interacting with the application?
- To what extent are the desired interaction qualities accomplished?

Prototype Limitations

The Marvel application had a few limitations. An embedded movie disappears when you click on a button. Therefore, the question of the virtual museum employee is two times implemented. The prototype cannot make real photos. Furthermore, the microphone cannot be activated. Therefore, a screen-recording was made during the test. This option is called 'screen-recording' on an iPhone.

Participants

During the validation test, four families were selected to participate. Figure 47 shows the characteristics of the participants.

Test procedure

The families were asked to join a visit at Museum Prinsenhof Delft or Science Centre Delft. The researcher was able to observe the family during their visit and while interacting with the application. To build trust with the participants (Portigal, 2013), the researcher first tried to make the children feel at ease by asking simple questions. The only task the participants got, was to use the application when they were triggered by an object or element in the museum. To find out how they feel and what they think about MuseumMakers, questions to the child and parents were asked at the end of the test. The exact questions can be found in Appendix C.1.

Data collection

In order to collect data for answering the research questions, observations of participants using the Museum Makers smartphone were needed. The participants were observed during their visit by the researcher. Notes were made during the test. The actions and voices were recorded by the function 'screen-recording' on the used iPhone.

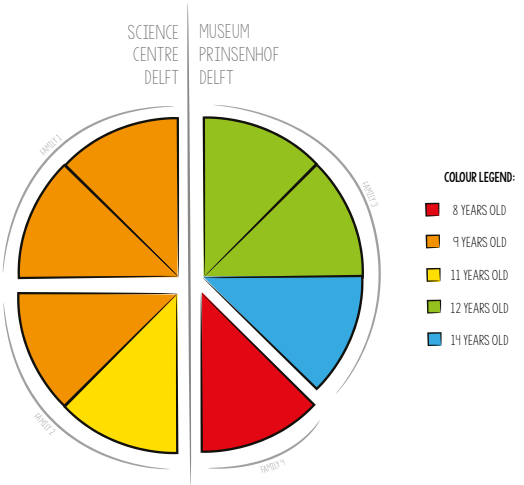


Figure 45 Characteristics of participants

Last, the collected feedback was put together in a table, in order to compare the collected feedback with the earlier mentioned ideal feedback. Secondly, the usability problems were noted down. Lastly, the interaction qualities were tested. To find out if the interactions while using match the intended interaction qualities, the prEMO tool was used (Desmet, 2018). The prEMO tool is not validated for this type of usage. However, it helped the researcher to quantify the intended interactions. While observing, the corresponding emotions of children were rated. Please refer to Figure 48 to see which emotions correspond with the intended interaction qualities. For each participant, the most prevalent emotions were noted down.

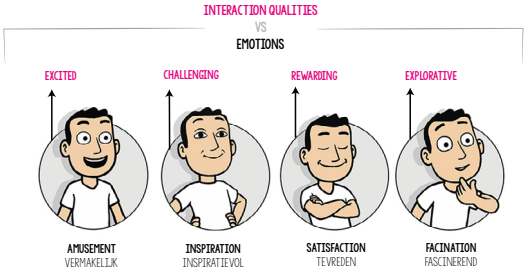


Figure 46 The corresponding emotions towards the intended interaction qualities

Results

This section describes the results of the performed data analysis.

General remarks

Several observations are interesting to mention here. Using MuseumMakers works best when two children are appointed to give feedback. In this way, they can interact with each other about their opinion and help each other to put into words what they actually think. However, this works best when the two children can act serious when they are together.

When they perform macho behavior towards another, they will not take the tasks seriously. Then the chance arises that they provide useless feedback with jokes.

When working with younger children, aged eight or nine, the help of parents is sometimes required. A briefing for the parents is needed, to make sure they will not influence the feedback of their child(ren).

Several children wanted to rate every aspect or object in the museum. Therefore, the application needs to make clear that is not the purpose of the application. Only objects that stand out should be used for feedback.

Lastly, sometimes it was hard to hear the questions in the application. In these situations, there was too much background noise. A simple solution to this is making earphones available at the museum desk.

Verify usefulness of collected feedback

To reflect on the results of the collected feedback and answer the first research question, all results were written down in a spreadsheet.

Figure 47 Four examples of collected feedback during the validation test

A few examples of the collected feedback can be found in Figure 49. The collected feedback is compared to the ideal feedback that was described in Section5.D. Please refer to Appendix C.2 to see all results.

In every case the objects and value judgments were clear. In four of the twenty-eight feedback cases, the 'why' behind the opinion was not clear. In these cases, children were not able to formulate the reason behind their opinion.

Note that the usefulness of the collected feedback is good according to the comparison. However, the 'why' behind the option of children can be even better. Now only one concrete question is asked. Asking even further, would improve the results of the why behind the opinion of children. The most important part is if the educators find the feedback inspiring and useful insights. This is shown in the next section of part two.

Figure 50 shows the number of picked value statements in order to decide which statements are popular and which statements are less popular. Besides, the statements 'I find this funny' and 'This was a victory for me' show the least interesting whys because they repeat what is in the value judgment already said. Further research is needed to test if these statements can be phrased differently, in a way it evokes a better answer to the why question.

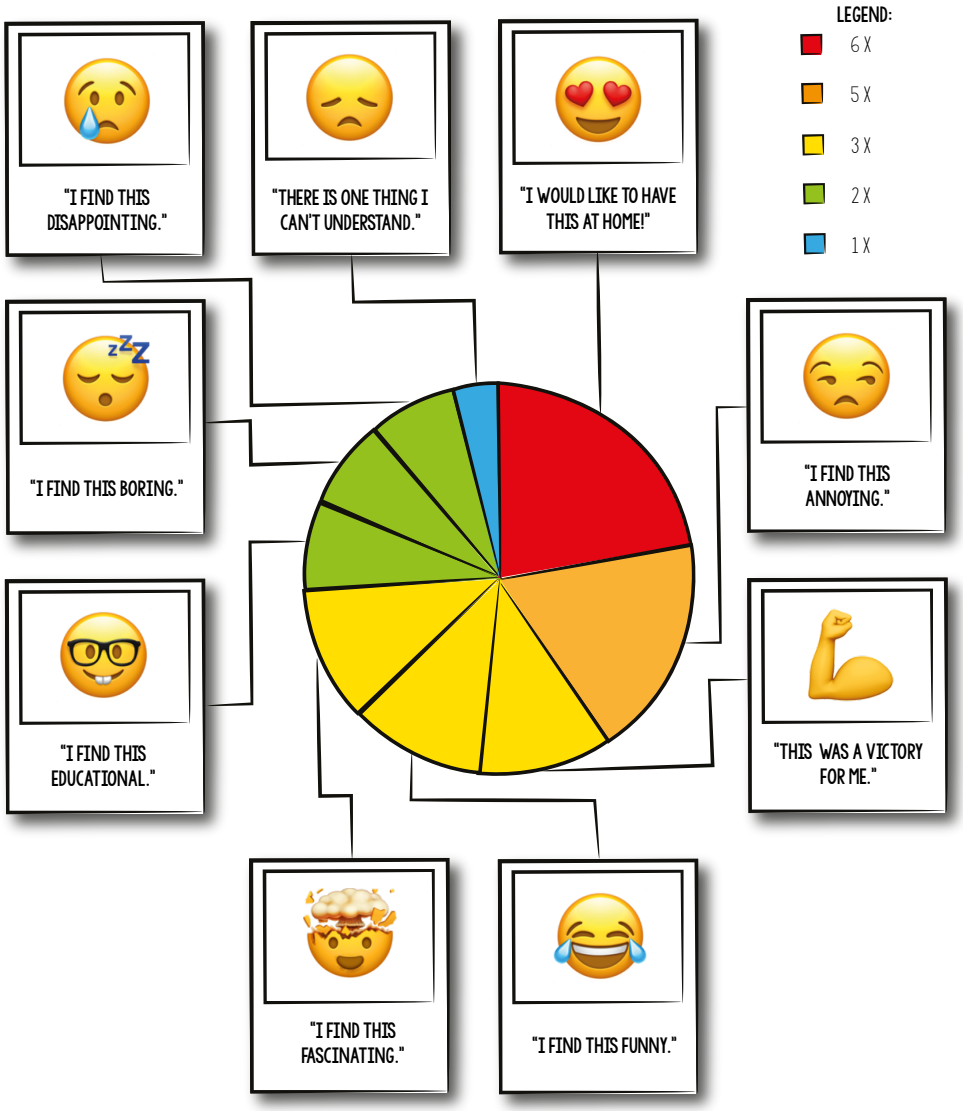


Figure 48 Number of picked value statements of the eight participants

Usability

To answer the second research question we had to look at the usability aspects of the application. The children were able to use the application instinctively. They had no problems with finding the buttons at all. The only button that was not selected was the "I don't get it" button. Clicking this button resulted in a movie that explained an example of the preferred feedback. This movie should be made mandatory in the beginning of the application.

The first feedback loop was a bit difficult for children. Therefore, it would add if an example loop is implemented. In this example loop, an example of the ideal feedback can be shown as well. After the first loop, it was quite easy for children to give feedback on the smartphone. However, they assumed the question of the virtual employee was the same every time. This became clear through the observations of children skipping the movie a multiple times. This means it should be visible that question is different every time. Another option is to make the question video compulsory before answering it.

One parent noticed that his child was feeling indifferent. His son had troubles with finding (un)exciting elements. He suggested it would be better if the application had a game mode in it. Instead of waiting for the child finding an interesting object, you could give the child an assignment as well. For example, find three boring objects. The downside of this type of assignment is that the child is triggered by the assignment, and is not triggered by an object in the museum. Therefore, the assignment can be leading. The child is finding elements to complete the assignment, while the goal of the application is quite different. However, this assumption is not tested yet. Therefore, a game mode can be tested to understand if this mode bears constructive feedback.

User Experience

To prove the user experience was like intended, emotions were rated by the images of the prEMO tool. In Figure 51 the results are shown.

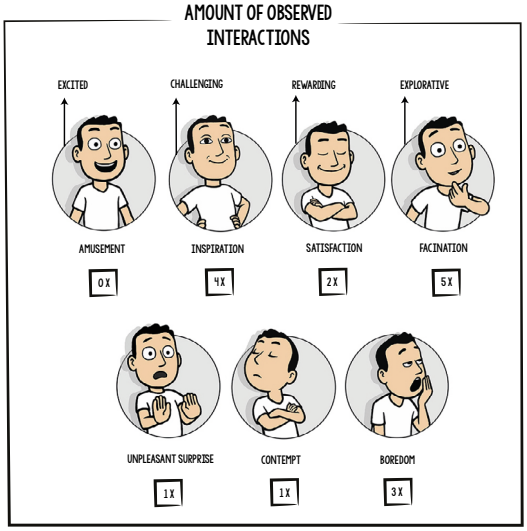


Figure 49 Number of observed interaction (only two emotions per participant were noted down)

As this figure explains, not every participant was enthusiastic about using the smartphone while their museum visit. Most children were looking very serious at the moment of giving feedback. This can be explained by the test-setting. Participants were observed during their visit. However, the children confirmed they liked using the tool at the end of the test. This is proven in the quotes mentioned below:

"Deze app is wel handig. Het is makkelijker dan schrijven. Ik vond het wel leuk bedacht met dit vragen. Dat is leuker dan lezen."

"This application is convenient. It is easier compared to writing. I liked the questions. That is more fun compared to reading.

"Ik zou het wel leuk vinden om dit tijdens een museum bezoek te doen. Hiermee kan namelijk heel goed je mening geven."

"I would like to perform this during a museum visit. This application helps me to give my opinion."

From the answers to the questions at the end of the test, we can conclude the tool was an interesting and explorative addition to the museum visit. However, more attention is needed to make the tool exciting for children Furthermore, the visit was quite different for parents and child compared to a normal visit. They enjoyed using the tool together, but it was more focused on the tool than on the museum experience. The parents would like to get something out of it as well. Suggestions were made that the application can show recommendations for other elements in the museum. For example, showing the next suggestion: 'If you had liked this, you probably will like ... as well!'. The suggestion can be based on collected data in the past. On the other hand, the addition of getting a summary of the visit send home, by emailing the photos and voice recordings, was appreciated by child and parents.

9.B PART 2: MUSEUM EDUCATORS

The goal of this part was to find out if museum educators find the feedback useful and constructive. Besides we want to validate that the feedback provides inspiration to the museum educator and how and in what type of form the educators would like to receive the feedback.

Research Questions

- To what extent is the feedback useful and inspirational according to the museum educator?
- How and in what type or form would museum educators like to receive the collected feedback?

Test procedure

The head of education of both Science Centre Delft and Museum Prinsenhof Delft were selected to perform a semi-structured interview. During the interview, the research questions were discussed in small steps. The interview protocol can be found in Appendix C.3. Quotes from these interviews were used and the insights are shown below.

Results

This section describes the interesting quotes from the interviews and the interpreted findings.

Both participants were enthusiastic about the MuseumMakers application and collected feedback. Especially because they do not perform research about regular visits themselves. First, the collected feedback confirms assumptions. However, some feedback points were new to the educator, like the quote below indicates:

"Het meeste is wel bekend. Het is wel interessant dat ze zeggen dat het te lang duurt (bij de super geleidende trein). Het zijn weinig handelingen en het duurt wel heel lang. Dat is wel iets waar we iets mee kunnen."

"Most points are well-known. It is interesting that they say it takes too much time (at the superconductivity train). It's a long time span and not so many actions. That is something we can change."

The museum educator found it interesting when two conflicting statements were picked for one specific object. For example, the smart steering wheel is fun, because you can drive a car yourself. However, this object is perceived annoying by other children, because the waiting line takes too much time.

Furthermore, the feedback can be very useful when a museum is in a transition phase, indicated by next quote:

"Het is wel goed om dingen die wij voor waar aannemen, om die weer eens op deze manier te testen. We zitten nu in een transitie fase, dan is dit wel heel handig om het heel duidelijk te hebben waar de knelpunten zitten en wat de succesfactoren zijn."

"In this way, we can test our assumptions about the museum experience. We are in a transition phase right now, then this tool can be very useful to indicate the bottlenecks and the success factors."

The second goal of the interviews was to discover in what type or form the feedback should be delivered to the museum employees. The participants indicated two criteria, shown in the two quotes below:

"Ik vind het handig om dit op papier te hebben."

"I would like to receive this on paper."

"Ik zou de resultaten graag kunnen sorteren. Zo kan een relevante selectie maken."

"I would like to sort the results. In this way, I can create a relevant selection."

These criteria point out the importance of transcribing the recorded voice fragments. The responsibility of transcribing the feedback should be situated by the museums themselves or by the museum association. Nonetheless, this involves a time-consuming process or it involves money by hiring a transcriber. However, the feedback can serve as inspiration according to the educators after transcribing. One participant suggested that an infographic about the feedback can be very useful for them.

Concluding, an online platform is suggested to view the collected feedback. The main criterium is that the option of sorting the feedback should be available. Furthermore, an overview of the collection should be printed easily. A possible addition can be the function of sharing insights with each other. In other words, that every colleague can share their learnings from the collected feedback. Ideally, a workshop is performed by a professional creative facilitator. A workshop is beneficial because then the insights museum employees get from the collected feedback, can be taken one step further. Formulating action points would make the circle complete because then the museum employees formulate concrete initiatives for improving museum experiences for children. The workshop should be prepared and performed by a professional. The exact content of this workshop still needs to be designed. A first suggestion can be found in Appendix C.4.

9.C Conclusion

To conclude this chapter, the research questions of this Chapter will be answered in this section.

PART 1

To what extent is the collected feedback constructive?

In four of the twenty-eight feedback cases, the 'why' behind the opinion was not clear. In these cases, the ideal feedback was not achieved. This shows that children are able to provide constructive feedback with the application.

To what extent do children experience usability problems while interacting with the application?

No usability problems were indicated. However, participants pointed out that the first feedback loop needs more effort to fulfill. Therefore, an interactive feedback loop is recommended at the start of the application.

To what extent are the desired interaction qualities accomplished?

Three of out of four interaction qualities were accomplished during the test. The children seemed not excited while using MuseumMakers. This can be explained by the test set-up, which resulted in a discomforted feeling in every case. At the end of the test, participants indicated they prefer the application compared to common methods for providing feedback.

PART 2

To what extent is the feedback useful and inspirational according to the museum educator?

The museum educators indicated they rather see more details about the why behind the opinions of children. Therefore, a second probing question can be implemented in the feedback loop.

How and in what type or form would museum educators like to receive the collected feedback?

The museum educators would like to receive the collected feedback on a paper or on a digital platform where the feedback can be sorted out per category.

10.

Final Conclusion

At the start of this project, the following assignment was formulated:

Design a tool and method that enables children (aged 9-12 years), who visit museums with their parents, to provide museums with qualitative constructive feedback about their museum experience, in such a way that this feedback is effective in improving future museum experiences of children.

During this graduation project, the following

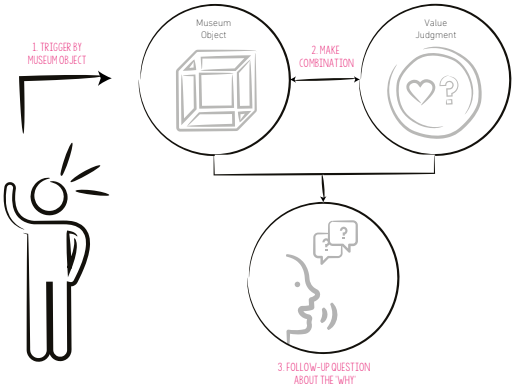


Figure 50 Method that was proven to work as a structured way of letting children provide constructive feedback

method was found:
For developing the corresponding tool a more precise design goal was formulated:

Design a tool that enables children to give their opinion about their museum experience [1], and provides museum educators with inspiring feedback that can lead to concrete steps for improving the museum experience of children [2].

Chapter 9 showed that the MuseumMakers application is a good manner to let children provide constructive feedback about their museum experience. Especially, when it is compared to the current methods museums use to get to know children's opinions.

If you ask a child about how their museum experience was, then children probably will answer something like "It was fun". A follow-up question will not be adequate enough to discover the details about children's museum experience. The tool that was developed solves this problem completely. However, some feedback points were insufficient according to the museum educators. The details about the why were not sufficient yet and a second follow-up question is needed.

The insufficient feedback results can be explained by a lot of variables. Of course, every child is different. One is better in providing feedback than another. Furthermore, the mood of children can influence the feedback as well. It is quite hard to take all this into account.

Next section shows recommendations to the design and recommendations for implementation. The limitations of the project and contributions of the project are shown in order to conclude this graduation project.

Recommendations

The recommendations are divided into two topics. This section shows recommended changes in the current design and recommendations according to the further development of the tool.

Design changes

- Making earphones available would be beneficial in museums where background noises occur.
- The maximum number of the same value judgment frame should be equal to three times.
- The button 'I do not get this' should be removed. Instead of this movie, an interactive explanation of the feedback loop should be implemented at the start. In this way, children get to know how the feedback loop works an example of preferred feedback can be shown.
- Another supplementary question can be added to discover more details about the why behind the opinion of children.

Further development

To fully justify the MuseumMakers application, more tests are needed. First, this can be done with Museum Inspectors, because they already are very familiar with going to museums and answering questions about their visit. When a museum is curious to hear the opinion of children that do not go to museums a lot, they can consider offering a free ticket in order to recruit them.

The use of an iPhone is recommended, especially when the prototype does not fully work yet. This is recommended because of the 'screen-recording' function. With this function, the processing of the feedback is very easy. This is due to the fact the colours of the application indicate where feedback is provided.

Multiple young participants indicated that they miss certain frames. For example, they missed statements like 'I find this fun' or 'I find this stupid'. The option of adding your own statements should be tested. However, there is a possibility that children provide less interesting content. Because statements like 'fun' and 'stupid' are more general opinions.

Furthermore, children react differently to the different questions of the virtual museum employee. This means an option of different difficulty levels is an idea to cope with the different cognitive skills of children. For example, 'medium hard' and 'expert' level. This should be tested as well.

Lastly, the processing part of the feedback should be made more concrete. This process should be designed and tested as well. Preferably, a creative facilitator should process the feedback. He or she can create workshops amongst the feedback that was provided by children.

Limitations

During this project, it became clear that a lot of factors influence children This is a big downside of letting children provide feedback themselves. This definitely should be taken into account while processing the provided feedback. However, this project provides a working tool for children to create constructive feedback to museum employees about the museum visit of children. Children can create this feedback by themselves, although sometimes a bit of help is needed.

The tool should be tested in other types of museums. No knowledge is present about how the tool will work in other museum types, like art museums, anthropological museums, natural museums or commercial museums. The same applies to bigger museum compared to Museum Prinsenhof Delft or Science Centre Delft.

All the insights provided in this thesis are based on a small sample of participants. By way of contrast, each time the participants were new and had no knowledge about the project. In this way, the researcher attempted to speak to as many people as possible concerned with the project.

During the conceptualization phase, only specific elements of the concepts were tested. Other ideas were not tested and still can contribute or can be combined with the current tool. For example, the exploration of the secret feedback can be contributing.

Contributions

More extended research is needed to fully justify the MuseumMakers application. However, this thesis provides a tool (including the corresponding method) to help children to give their opinion about elements in their museum experience. This method is translated into a digital application. Furthermore, ideas for further development are described. A vision on how the feedback should be processed is shown as well. Lastly, this thesis describes insights about the role of educators in different museums (please refer to chapter 3).

Combining the insights of not only children but museum educators was very valuable to create a tool for both parties. This valuable approach made it possible to create a tool that can be beneficial to create better museum experiences for children.

11.

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"O children
Lift up your voice
Lift up your voice
Children
Rejoice
Rejoice"

From the album *Abattoir Blues / The Lyre of Orpheus (2004)*
by Nick Cave & The Bad Seeds