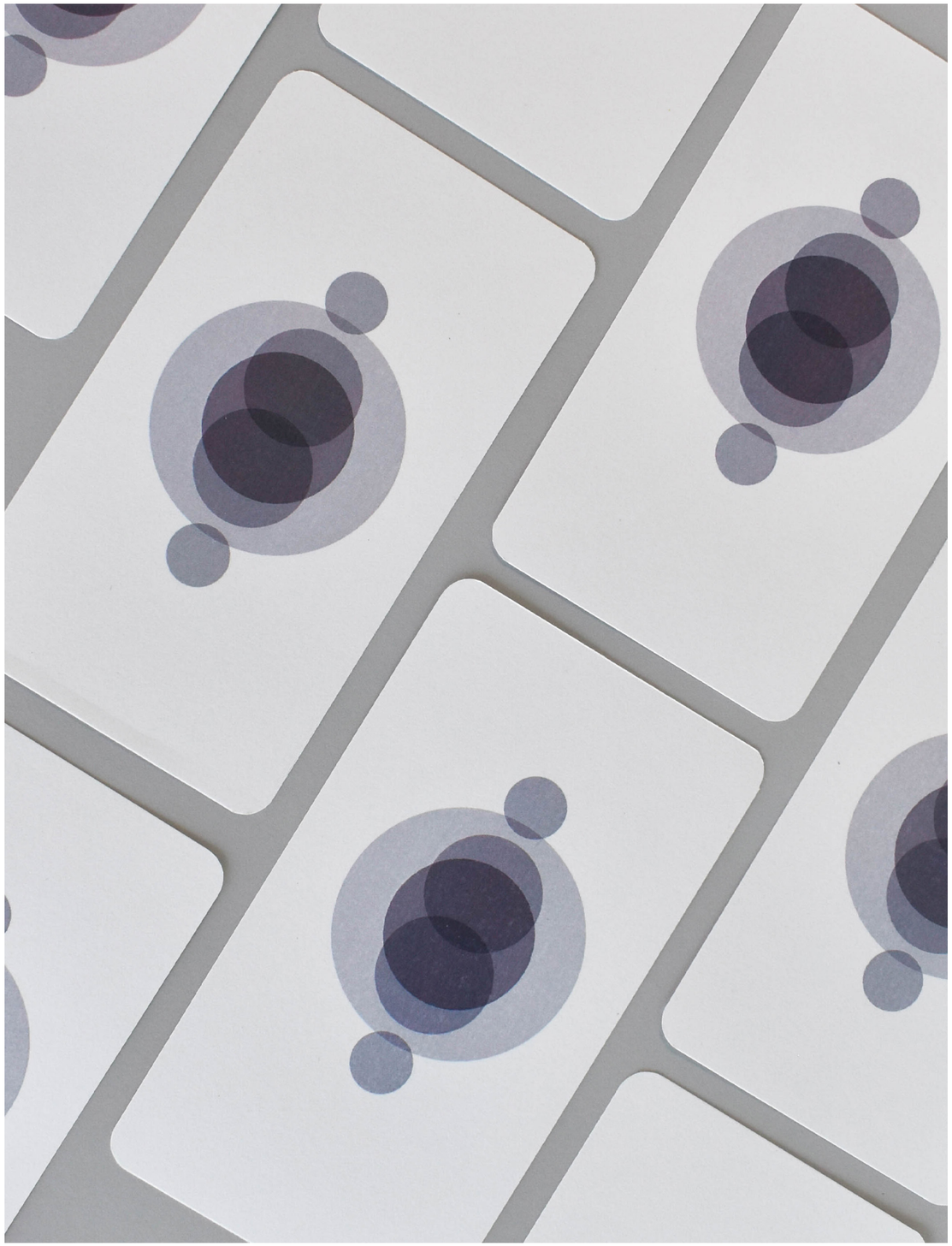
# Designers of the Future

*Engaging children in speculation through museum experiences*

María Peiró Torralba
**MSc Design for Interaction**



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MSc Design for Interaction
Master's Thesis

# Designers of the Future

***Engaging children in speculation through museum experiences***


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# Abstract

Nowadays, children are growing up in a highly unstable world. In our popular, shared narrative, ‘the future’ seems to have become a synonym for socioeconomic crisis and environmental disaster. In the hugely globalized and intercommunicated reality we live in, this is a story that children can hardly stay oblivious to. A European Union-wide survey showed that 1 in 10 young people between the ages of 11-17 experience mental health issues, with fear of the future being cited as one of their main worries (ChildFund Alliance et al., 2021). “What are you going to do when you are older?” The questions we ask children have become much heavier in recent times, as uncertainty renders their future more opaque than ever.

This graduation project started from a very broad inquiry: how can we help children realize the power they have over what the future will be like, through a museum experience? In other words, how can we invite children to speculate about futures in a way that is empowering for them? These questions were posed by Nieuwe Instituut, the museum for architecture, design and digital culture of Rotterdam; they represent the ultimate goal of the Co-Learning Expo, which is currently in its early stages of development.

This project’s goal was to ***provide design guidance on how to engage children in speculation about futures through an empowering, transformative museum experience.***

In order to do this, literature on futures, children’s development, children’s empowerment and participation in museums was reviewed, as well as case studies of cultural institutions who have co-designed exhibitions or other experiences with children. This allowed for a better understanding of the context that the Co-Learning Expo is seeking to fit into, and to position it as a co-designed participatory exhibition. To gain insight on how participation and futuring are approached in the field of design, several methodologies were looked into, such as Participatory Design, Speculative Design and Context Mapping.

To truly grasp what children’s perceptions and attitudes towards the future are, participatory, generative activities were carried out with them. Additionally, parents and a teacher were interviewed, in order to get adults’ perspectives as well.

The insights gained in the research phase of this project were translated into design requirements for the design of empowering museum experiences for children regarding futures. In order to fit the needs of the final users of this guidance — design agency Opperclaes and the Co-Learning department of Nieuwe Instituut — the format of these requirements was improved through three iterative cycles. The result was Designers of the Future, a flexible toolkit meant to support its users during ideation and evaluation processes for museum experiences — such as the Co-Learning Expo. Through its use, the main challenges to be addressed are brough to the table, in order to truly create an empowering experience for children.

The design challenges formulated within this project are:

1. How can we encourage children to create their own images of the future?
2. How can we stimulate children to engage in futuring?
3. How can we help make the future more concrete and tangible for children?
4. How can we design an empowering experience for children?
5. How can we accomodate for children’s preferences when expressing their ideas?
6. How can we stimulate children to take the lead and explore freely in this experience?
7. How can we ensure the intricacy of the exhibition is adequate to different ages?
8. How can we make space for children’s concerns and fears, as well as their hopes?

The final toolkit was evaluated with design agency Opperclaes and an expert on co-design with children, with positive results overall. Since this project was meant to be a first incursion into this line on inquiry, recommendations for future research as well as next steps are offered.




# Dear reader,

Welcome to my thesis! I am very excited and proud to be able to share this document with you. This project is very special to me, as it has been a chance to rediscover who I am as a designer and (for the first time) a design researcher. It also marks the end of my two years as a TU Delft student, which have felt both way too short and like an entire lifetime.

I would like to keep this introduction brief, but that is unlikely to happen. If it takes a village to raise a child — or so the saying goes — the same could be said about the creation of a thesis. In no particular order, I would like to express my deepest gratitude to...

... Arnold Vermeeren and Iohanna Nicenboim, who believed in this project from the very beginning, and helped fan the flames from what was only a tiny spark. Arnold, thank you for introducing me to the world of transformative museum experiences, as well as for your serene and gentle guidance. Iohanna, thank you for your endless advice and reassurance, and for showing me the way in my design research journey. To both of you, thank you for your confidence in me, your consistency, and your warmth. You were the best supervisory team I could have asked for.

... Hanna Piksen, who trusted me with the project of her heart. Hanna, you gave me the honour of adding my little seed to what I know will be a great garden. Thank you for your enthusiasm, your interest and your boundless questions — and for the encouragement, the check-ins before my deadlines, the reminders to take care of myself. It has been such a pleasure to have you as my mentor.

... The Co-Learning department and my fellow interns of Nieuwe Instituut. I thoroughly enjoyed working with all of you, and I hope our paths cross again in the future. (I will continue to consider myself an honorary member of Co-Learning, if that is okay).

... Opperclaes — Linda and Bruce, who opened the doors to their studio for me and listened to me talk for two hours. Thank you for your attentiveness; I know this project is in the best hands.

... Ingeborg de Wolff, who shared her expertise and her passion for children with me, and who helped me navigate the difficulties of working with children.

... Mathieu Gielen, whose input at several points of this project was invaluable. I cannot thank you enough for your openness to share your expertise and time.

... my family, who is always with me, whatever I do, wherever I go. Nieves, gracias por creer en mí y cuidarme tanto en la distancia. Mamá y papá, hay tantas cosas que agradeceros que no acabaría nunca. Gracias otra vez por darme el regalo de una educación. Os quiero muchísimo.

... the IDE friends that went on this adventure with me; there is too many of you to name, but you know who you are. Vanessa, thank you for the constant support, laughs and company; without you, this process would have been much harder and much less fun. Asli, thank you for being the best graduation guru, and for the extensive feedback written over the ocean. All of you, thank you for the hugs and the laughs and the talks. I am so proud of us. We made it!

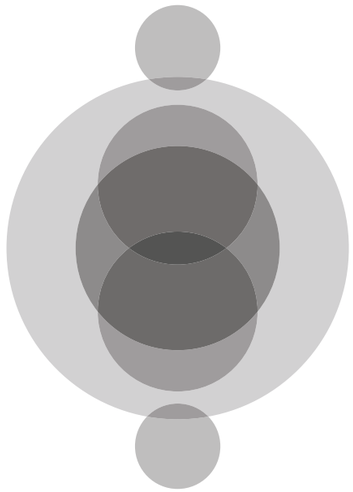
... my dearest housemates, past and present: Dafne, Elena, María, Orestes and Carolina. Thank you for being my home away from home, somehow both friends and family, and built-in cheerleaders.

... my dancing friends, who kept me moving and therefore sane, and whose love, joy and energy accompanied me to the finish line. Here's to all the lucky coincidences in the world.

... last but not least, to all the children that gave me their precious time, attention and wisdom during this project. Thank you for inspiring me, making me laugh, and making me uncomfortable — we have a lot of work to do to make this world a better place for you. I have full confidence you will do amazing when your turn comes.

... and finally to you, dear reader, for picking up this report. Thank you for your curiosity — which, as this project has taught me, is the ultimate superpower. Hope you enjoy!

*With all my love,*
*María*



# Glossary

**Co-Learning Department.** Education department of Nieuwe Instituut. They co-create learning-oriented experiences with and for the visitors of the museum — focusing primarily on children, teenagers and their families.

**Context Mapping (CM).** A set of generative research tools and methods, developed by Sanders & Stappers (2012). Its ultimate aim is to generate empathy with the users by immersing in their context and gathering rich experiential data.

**Futures Literacy (FL).** "The skill that allows people to better understand the role of the future in what they see and do" (UNESCO, n.d.). In other words, the ability to imagine different futures and reflect on their implications.

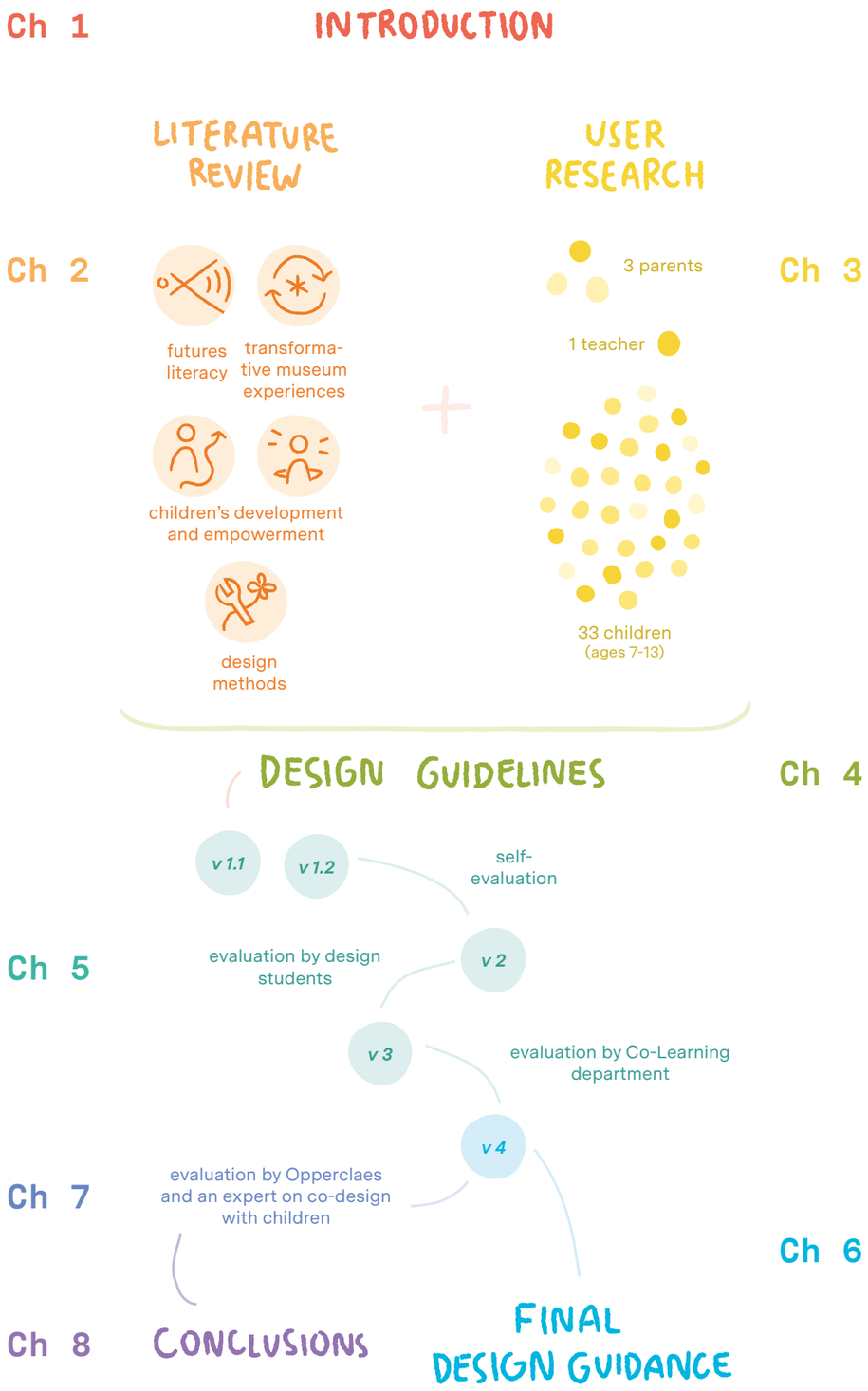
**Nieuwe Instituut (NI).** Netherlands' national museum for architecture, design and digital culture. Located in Rotterdam, it acts as a museum as well as a research institute, archive and agency.

**Opperclaes.** Rotterdam-based design agency, who will be in charge of the design of the Co-Learning Expo.

**Participatory Design (PD).** Design processes in which end-users (and sometimes other stakeholders) are actively involved in one or more of the phases. The aim of such a process is to develop products, services or experience that better fit the users' needs, through applying their knowledge and experience (Interaction Design Foundation, n.d.).

**Speculative Design (SD).** Critical design approach that aims to encourage people to analyze and reflect on the present through the imagining of possible (preferrable or not) futures; it "attempts to anticipate the future and at the same time helps us to re-think the present" (Mitrović et al., 2021).

**Transformative museum experiences.** Those in which visitors of museums are met with some sort of intervention (be it an exhibition, an interactive installation, a lecture, a workshop…) which generates a strong emotional response and leads them to reflect on a certain societal issue. Through this reflection, visitors can evaluate and eventually change their attitudes and behaviours, integrating new ones.






# Reader's guide

The main goal of this graduation project was to offer design guidance on how to create empowering museum experiences for children regarding futures. This guidance will be applied, specifically, to the design of the Co-Learning Expo of Nieuwe Instituut. This report describes the process followed, which is summarized in the accompanying diagram.

**Chapter 1** offers an introduction on the project, as well as some essential background information.

**Chapters 2** and **3** retell the academic and empirical research, respectively, that was carried out. Through them, a better understanding of how children think and feel about the future was reached.

**Chapter 4** compiles the design requirements for the Co-Learning Expo, formulated based on these insights.

**Chapter 5** explains the process followed to iterate on the design guidelines, in order for them to become as actionable and useable as possible.

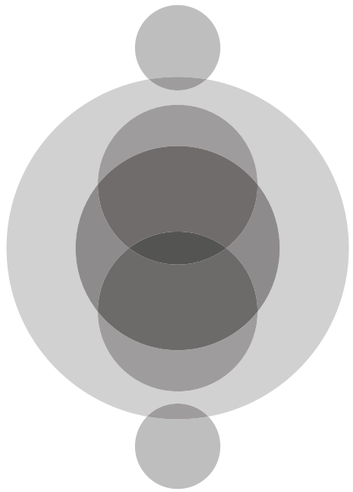
**Chapter 6** presents the Designers of the Future toolkit — the final design guidance.

**Chapter 7** describes the evaluation of the toolkit with its final users as well as an expert on co-design with children.

Finally, **Chapter 8** contains the conclusions of the project, including its main contributions, limitations, and recommendations for future work.

Each chapter can be recognized by its own color. Throughout this report, different 'Main insights' sections summarize the most relevant learnings from each part of the process.

Enjoy the read!



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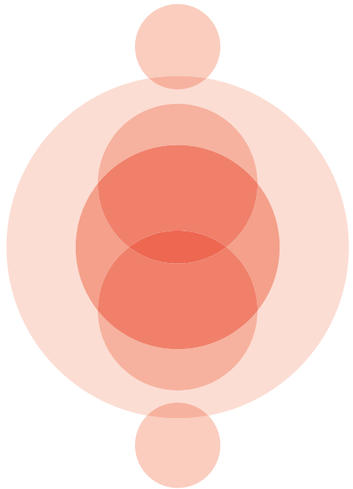


# Chapter 1. Introduction

What do you think will happen tomorrow? And this weekend? What about in ten, twenty, fifty years from now?

We cannot help but speculate about the future — in fact, we think about it all the time. But although in previous centuries, 'the future' was synonymous with progress, innovation and growth, in recent years that shiny vision has all but shattered. We live in uncertain times, where instability (social, economic, etc) rises as our planet struggles to provide the resources we demand from it. With the present already being tumultuous, the future has become not only difficult but also somewhat frightening to try and predict.

This is the context that children nowadays are growing up in. Children are experts at living in the moment, but being a child implies hearing (and being asked) about the future constantly. A European Union-wide survey showed that 1 in 10 young people between the ages of 11-17 experience mental health issues, with fear of the future being cited as one of their main worries (ChildFund Alliance et al., 2021). "What are you going to do when you are older?" The questions we ask children have become much heavier in recent times, as uncertainty renders their future more opaque than ever.

Nonetheless, the future will eventually reach us. So how can we make sure we are ready for it, even if we do not know what it will bring? Scholars argue we can do this through exercising our Futures Literacy — learning to think about the future, instead of avoiding it. Children will ultimately spend most of their lives in what is now the future. How can they develop this capacity, then? Although nowadays the future seems to be everywhere in the media and our common vocabulary, the chance to reflect on what futures we are imagining is rarely offered to us.

Museums are spaces where we are met by information and experiences we do not encounter in our daily lives. They are progressively taking on the role of testing grounds, safe spaces to experiment with possible societal transformations and what they mean to us. Museums can intentionally become liminal spaces — momentarily allowing visitors to put their beliefs on hold and experiment with different narratives, thus "helping people to explore new 'spaces of the self'" (Liedgren et al., 2023).

But how can museums encourage their visitors not only to reflect on societal issues, but also to imagine different alternatives in a tangible way? Nieuwe Instituut, the Dutch national museum for architecture, design and digital culture wishes to create such a space, to invite children to imagine the future. Still, how can this be done in an impactful and nuanced way?

> ***How can children be invited to go beyond the singular, predominant narrative of 'the future' and imagine completely new ones for themselves? And how can we design museum experiences to support them in this process?***

This graduation project aims to contribute to this line of inquiry, by creating guidelines on ***how to co-design empowering museum experiences for children, dealing with the topic of the future.***

This will, in turn, inform the design of the Co-Learning Expo, set to open in Nieuwe Instituut in October 2024. In order to create these guidelines, a proper understanding of Futures Literacy, children's development and how they currently perceive the future and what children's empowerment truly means was needed. In this project, participatory design, speculative design and contextmapping methods were used in the interest of untangling this issue. Figure 1—1 shows an overview of the research, design and evaluation activities carried out during the project.

Through literature review (Chapter 2) and user research with children, their parents and teachers (Chapter 3), a series of design requirements on how best to encourage children to imagine futures in an empowering manner were formulated. These requirements (Chapter 4) were translated into design guidelines, which went through several iteration cycles (Chapter 5). In the end, the goal of this graduation project was distilled into providing design guidance, and the format of its outcome evolved from design guidelines into a toolkit for designers and museum educators alike (Chapter 6). The final outcome was evaluated with the design agency that will design the Co-Learning Expo and an expert in co-design with children (Chapter 7), and recommendations for improvements on the toolkit as well as further research were formulated (Chapter 8).

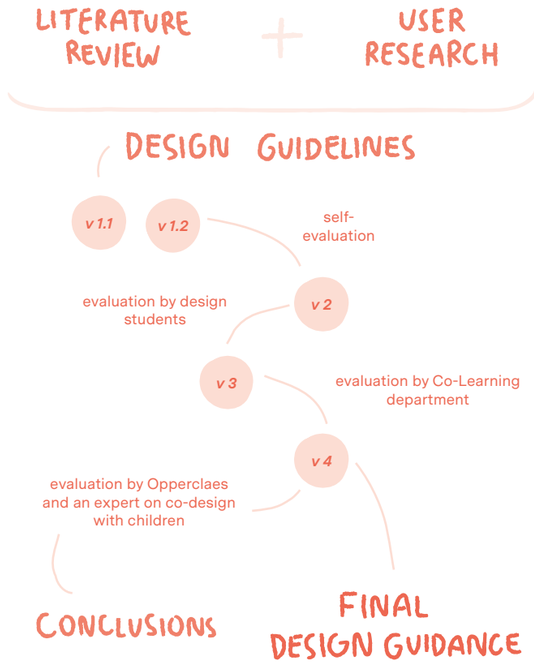



*Figure 1–1. Project process summary*

# Nieuwe Instituut and the Co-Learning Department

Nieuwe Instituut is the Netherlands' national museum for architecture, design and digital culture. Located in Rotterdam, it acts as a museum as well as a research institute, archive and agency. Resulting from the fusion of three different Dutch institutions (the Netherlands Architecture Institute, Premsela Dutch Platform for Design and Fashion, and the Virtueel Platform for digital culture), Nieuwe Instituut was established in 2013. It takes care of the National Architecture Archive of the Netherlands. Aside from its conservation labour, Nieuwe Instituut also serves as a amplifier for cultural difusion to the citizens of Rotterdam, citing multivocality as a main value. To this end, many different events are held in the Instituut.

All of this is to say that Nieuwe Instituut's mission and programme goes beyond that of a "traditional museum". However, that is the facet of the Instituut that this project will be dealing with: the museum as a physical space where visitors come to experience and learn something. What this learning could be and how it could happen falls under the responsibility of the Education department of a museum.

Throughout the last decade, the Education department of Nieuwe Instituut has been experimenting with new ways of relating to its visitors, focusing primarily on children and their families. Recently, the department was re-named as "Co-Learning". This change reflected the shift in their approach in the last few years, from a uni-directional educational labour towards a collaborative and playful way of learning together.

The activities of the Co-Learning department are varied. They frequently organize FamilieFest, an event during school holidays where children and their families are welcomed at the museum. The program changes each time, matching the exhibitions on show at that moment. Additionally, they receive visits from schools, which usually consist of guided tours and workshops. Their tour guides are called "Detour guides" ("Omleiders", in Dutch): a group of artists and designers that co-create their own tours by looking at the museum through the lens of their discipline. For families visiting without a guide, the Family Expeditions are available — a package of prompts and props for children to explore the exhibitions in a different way. Co-Learning also intervenes in different events organized by other departments.


*Figure 1–2. FamilieFest Waterwerelden, July 2023*

# The Co-Learning Expo

The next step of the Co-Learning department is developing its own exhibition designed "with and for children" — what will be from now on referred to as the Co-Learning Expo. This semi-permanent exhibition aims to empower children about their role in designing the future. Nieuwe Instituut's goal is for this exhibition to become a go-to space for children with their families and schools, where they can have playful learning experiences. The exhibition, set to open in October 2024, will consist on different installations or stations, each one presenting a different topic related to the future. These topics are yet to be defined; this graduation project offers some recommendations on what they could be based on user research with children.

In terms of logistics, the physical space where the Co-Learning Expo will be housed is Gallery 3 (Fig. 1—3). Located in the upper floor of the museum, it consists on several long, narrow corridors. Currently, this gallery hosts exhibitions from external curators (often multiple of them at once). Ideally, the Co-Learning Expo will take up the entire floor.

At the moment of beginning this graduation project, the Co-Learning Expo was in its very early conceptualization stages. This thesis aims to take the first steps towards suggesting what it could become, beginning with an exploration of the context of the Expo. This investigation will be described in the following chapter.

*Figure 1–3. Gallery 3, Nieuwe Instituut.*

# Opperclaes: the designers of the Co-Learning Expo

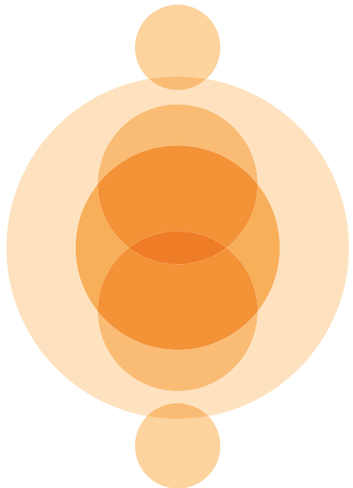
Rotterdam-based design agency Opperclaes consists of Bruce Tsai-Meu-Chong and Linda van der Vleuten. With a background in graphic design, in 2010 they opened a gallery together, with the aim of providing young Rotterdam creatives with a platform to share their work. In 2017, they transitioned into a design studio. Nowadays, they offer a variety of services, such as large scale mural productions, typographical installations, art consultancy and graphic design (Opperclaes, n.d.). Their work deals in many cases with interventions in the public space; they often carry out participatory activities with neighbours. They bring this co-creative spirit to all of their projects, which range from comissions from commercial brand to initiatives from municipalitites and cultural institutions.

Over the next 14 months (until October 2024), Opperclaes will be in charge of developing the design of the Co-Learning Expo, in collaboration with children from Rotterdam.

*Figure 1–4. Basketball court Afrikaanderplein. Opperclaes x Rotterdam Streetculture Weekend x 3x3 Unites, 2019*

*Figure 1–5. Parklet TheresiaSchool. Opperclaes x Humankind, 2018*


*Figure 1–6. Westblaak Crosswalk Design. Opperclaes x Streetmakers x Ge,meente Rotterdam, 2017*



# Chapter 2. Project definition: Exploring the project space

## Theoretical foundations

In order to empower children in regards to the future through the design of a museum experience, it was first necessary to explore and define some key concepts. What do we mean when we talk about the future? What challenges are we most likely going to face in the future — and what do they imply for children? How do *they* think about the future? And on the other hand, what roles can museums play in these moments of societal transformation? How can they truly have an impact on their visitors?

The analysis described in this chapter is based on a literature review on the future and the concept of Futures Literacy, children's development and transformative (museum) experience design, as well as methods such as participatory design, speculative design and contextmapping techniques. This review includes primarily academic research, and sets the foundations for the project.

### The future(s) and Futures Literacy

When we hear the word "futuristic", a very specific set of images come to mind (namely of shiny, glass and chrome buildings, high-tech mobility and communications, and space travel). However, this glittering vision of the future is no longer one that seems likely — or at least, not without some very prominent dark sides to it. Continuously exploiting the Earth's already waning resources, it seems humankind is crossing a boundary into a future marked by ecological, social and economic instability. If these are the cards we are being dealt, how can we create futures that are still worth fighting for? And how can we break down the actions needed to make these futures happen?

The future has always been subject to speculation, but never before had it been such a matter of concern. However, simply worrying about the future, without seeing how we can influence it, can often feel pointless. The future cannot be predicted or controlled within a certain degree of certainty — which is why futures are often referred to in the plural, since there are infinite possibilities. Still, what if imagining the future is not a futile endeavor, but a valuable skill to develop?

Futures Literacy is defined as "the skill that allows people to better understand the role of the future in what they see and do" (UNESCO, n.d.). According to UNESCO, in practice Futures Literacy (FL) is built by intentionally exercising the human capability to imagine the future. The ultimate goal of developing FL is to create images of the future in a more democratic and collaborative way, as the first step towards reflecting on what our present actions mean for those futures — and potentially taking action to either ensure they will, or will not, come to pass. Through becoming more futures literate, people / communities / societies can learn to let go of the false idea of certainty, and instead grow more resilient and adaptable to possible futures.

The question this project intends to raise is the following: how can museums help to build the Futures Literacy of their visitors? This project serves as an experiment on how museums could attempt to take on this role.

A more detailed understanding on what Futures Literacy is was reached; the next step was learning how children can develop this ability. However, it was first necessary to learn more about children's (cognitive and social) development. This leads us to the following section.

## Children as a user group

Children have their whole lives ahead of them. They are going to live most of their lives in the future — which, looking at the present we are living in, might not seem like such a good position to be in. However, children's unbounded imagination allows them to look beyond what adults can see and picture brighter, more hopeful futures for themselves. An argument can be made that by developing their Futures Literacy, new generations could have an extra tool in dealing with a complicated future. Demneh & Darani (2020) found that "those children that believe themselves to be influential in changing the future presented positive and optimistic images of the future." It also stands to reason that adults have something to learn from children's fresh-eyed perspective — but in order to do that, children's voices need to be heard.

In this case, the Co-Learning Expo at Het Nieuwe Instituut is preliminarily aimed at children from ages 6 through 14. However, that is a really large age range, which touches upon three distinct developmental stages: from 2 to 7 years old (preoperational), 7 to 11 years old (concrete operational) and 12 and up (formal operational) (Piaget, 1964). Since this project aims to engage children in speculation about futures, most likely a certain degree of abstract thinking will be necessary. The literature on children's development was reviewed prior to defining a target group for this project.

According to Acuff and Reiher (2000) around age 7 the development of the right side of the brain, which rules logical reasoning, starts accelerating. This greatly affects the way that children approach even something as essential as play, moving away from unrealistic fantasy play towards (role) play that resembles real life situations. This comes hand to hand with the ability to think abstractly, which is essential for speculation. Based on these findings, the user group of this project was set to children 8 through 12 (or those with a similar maturity level). These ages correspond to Piaget's concrete operational stage, named as such because children can think logically much more effectively if they can manipulate real (concrete) materials. In turn, the Co-Learning Expo will be targeted mainly for children ages 8 through 12, while providing a positive experience for children aged 6-14 overall.

Also interesting to note is that this period of a child's life (8-12) is referred to as the "Rule/Role" stage (Acuff & Reiher, 2000). This means that they are gaining awareness of what is socially acceptable, what is right or wrong, and what their own role is in social structures. Feeling accepted by their peers becomes therefore a primary concern. In this stage, children also develop their sense of self-esteem and self-image; they start telling themselves the story of who they are ("I am pretty", "I am stupid") — no matter how true, or not, these statements actually are. This is therefore a moment in their lives where gaining awareness about their role in shaping the future could have a big positive impact.

*D.R. – Less is more, but a balance should be struck between simplicity and shallowness. Different layers of meaning could be included to cater to different ages.*

An interesting challenge is that to mark this new stage children tend to forcefully push away anything that they consider "childish" — they see themselves as different from younger kids and want that to be acknowledged. This means that a museum experience that has to include younger children as well will need to have several layers of complexity, so that older children do not perceive it as "too simple" for them. Additionally, social context plays a crucial role; the experience of children visiting the museum with their parents or siblings will likely be very different that that of those visiting with their peers as part of a school trip.

These factors were kept into account throughout the process and reflected on after each moment of interaction with the children. However, none of these possible contexts was considered as "out of scope", since the resulting design guidelines should be as universally applicable as possible.

*Children and young adults are at a time in their lives when their 'role identity' and their 'destination identity' are taking shape. They endeavor to answer momentous questions such as who they are, what roles they want to play, and what future they are looking for (Demneh and Morgan, 2018; cited by Demneh & Darani, 2020)*



## Children's rights to development

Children's knowledge about the future comes mostly from adults. Still, when it comes to serious environmental or social issues, adults often withold information from children, considering these topics to be beyond what children should worry themselves with. At the same time, children are often told that they are the future, the hope of society, and that the responsibility of dealing with these challenges will be laid on them. This seems somewhat of a contradiction.

Generally, there is a common perception of children as endless wells of potential and creativity, which they will be able to use to create a better future. While this is a lovely message, it is also slightly worrying. There is a lot of pressure being put on children nowadays. Are we expecting unwavering positivity from them, even as the future seems more and more dire? The Co-Learning Expo should lean away from these surface-level positive messages, which could provoke children's worries about the future to go unheard.

There has long been a dychotomy in, and much discussion about, how children and childhood are perceived: what is known as the 'being' vs. 'becoming' debate. As Uprichard (2008) describes:

> *'The 'being' child is seen as a social actor in his or her own right, who is actively constructing his or her own 'childhood', and who has views and experiences about being a child; the 'becoming' child is seen as an 'adult in the making', who is lacking universal skills and features of the 'adult' that they will become'.*

She goes on to propose that children are both 'being' and 'becoming' at once. Still, she puts forward the main two issues of seeing children as 'becoming' — which is a perspective I believe is currently widespread. The first one is that by focusing on the future, we neglect to pay attention to the present and to value children for who they are, instead of who they will be when they grow up. The second is the conception of children as 'incompetent' (in contrast to adults, who are viewed as 'competent'). As several authors have articulated (Alanen and Mayall 2001; Christensen and James, 2000; Jamesand others, 1998 & Lee, 2002 as cited by Uprichard, 2008), competency is relative to social context, and evaluated in relation to others'. Therefore, every child will have instances in which they are lacking competencies — but also those in which they are more competent than some adults (for example, regarding digital technologies).

In conclusion, although the Co-Learning Expo deals with the future and the role children will play in it, it should take care to consider that children are human beings and not only becomings. They are competent, and they have skills that in some cases adults do not possess. The Expo should embrace this duality and showcase the connection between children's present and their future.

We have learned more about the topic of the Co-Learning Expo (the future), as well as its users (children). To complete the picture of the context of this project clearer insight into museums, their role in societal transitions and learning experiences was needed. All of this will be discussed in the following section.

## MAIN INSIGHTS

If children believe they have influence on the future, they have a more positive perspective on it (Taheri & Darani, 2020).

Children ages 8-12 are developing their logical reasoning and abstract thinking capabilities. They are also building their narrative of the self and start learning about social rules and roles; social dynamics become very influential in their behaviour (Acuff & Reiher, 2000).

Children in this age range (8-12) see themselves as different from younger children and reject "childish" things (Acuff & Reiher, 2000).

Seeing children only as 'adults in the making' has several pitfalls and can lead to underestimating children; it should be avoided as much as possible (Uprichard, 2008).

## Transformative museum experiences

We live in a rapidly changing world whose complexity seems to increase by the day. This means that in our daily lives we are likely to encounter disorienting dilemmas, defined by Häggström and Schmidt as "experiences that force a person to question and change her point of view regarding a certain phenomenon or situation" (2021). When we are faced by these dilemmas, it is possible we go through a transformative experience — which means our worldview might be altered, based on the self-reflection this encounter invites us to do (Gaggioli, 2016). If this happens, it could eventually lead to lasting changes in behaviour.

It could be argued that transformative experiences are, fundamentally, learning processes. Mezirow (1978) established ten phases of transformative learning; Nohl (2015) proposed an alternative empirical model, consisting on five stages. An overview of these frameworks, as well as my own interpretation, can be found in Figure 2—1. In summary, a transformative experience occurs as follows. First of all, an awareness of a need for transformation (usually caused by a disorienting dilemma) kick-starts the process. There is therefore a need for (self-)reflection, in order to gain a better understanding of the societal issue at hand, as well as one's current role in it. Once this reflection has taken place, the time comes to start exploring which changes in one's behaviour could be made, what sort of impact is being sought out and how one's social environment receives these changes. In this stage, having access to a safe space in which to carry out this exploration of possible futures becomes very helpful. Slowly, old practices are replaced by new ones, as these gain importance in a person's life. Finally, the transformation is integrated into one's own life, through the incorporation of new viewpoints and behaviours, as well as through social consolidation.

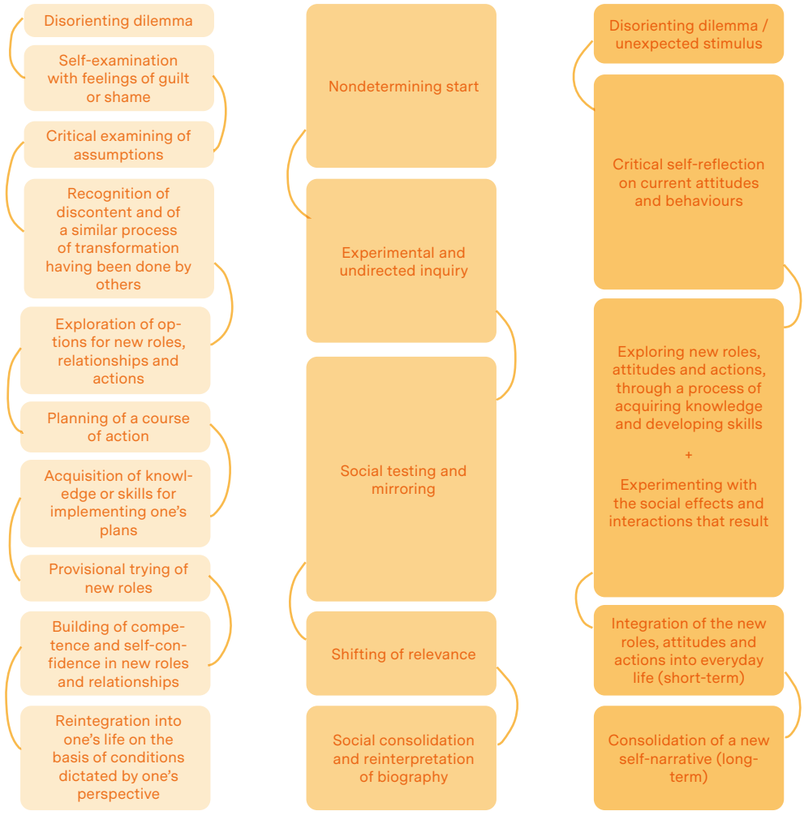



*Figure 2–1. Comparison of phases of transformative learning. Source (left to right): Mezirov (1978), Nohl (2015), own creation (2023).*



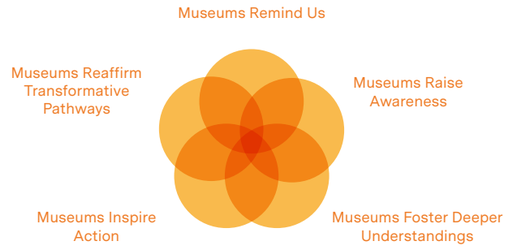



*Figure 2–2. Roles of museums in people's narratives of transformation. Source: Bergevin (2018)*

What we refer to as transformative museum experiences, therefore, is those in which visitors of museums are met with some sort of intervention (be it an exhibition, an interactive installation, a lecture, a workshop…) which generates a strong emotional response and leads them to reflect on a certain societal issue. These sorts of experiences are becoming sought after by museums, whose role is expanding beyond being only heritage institutions. Nowadays, museums are broadening their focus to include past, present and future. As Freedman (2000) stated:

> *'Just as the great museums were able to create awe, wonder, and significance concerning dinosaur bones and African masks, it is now going to have to be equally inspiring about the needs of the future and the needs of today, of the sifting through mounds of information and knowledge, separating out what is important, and getting the word out in a way that motivates, not just stimulates.'*

Museums also serve as meeting places for communities, becoming a space for collective learning (Falk & Dierking, 2018). All together, this means museums are in a good position to kickstart the conversation (or offer new perspectives) around societal transformations. So how can museums effectively become a space for transformative learning, a safe space for the exploration of alternative ways of living?

Bergevin (2018) identifies five key roles that museums can play in people's narratives of transformation (Fig. 2—2). Museums can remind us of the past, raise awareness about the present, foster deeper understandings of societal issues, inspire us to take action and reaffirm those already embarked in transformative pathways. One museum can have more than one role at a time for one person; it can also have different roles for people, depending on what stage of transformation they are in. Interesting to note is that emotional engagement seems to be a very helfpul element to enable transformative experiences to occur.

Sitzia (2016) investigated the impact of narratives in visitors' learning in museums, with a focus on transformative learning specifically. She postulated that discursive (narrative-based) and immersive (experience-based) exhibition design models lend themselves to different types of learning. While in discursive exhibitions "the experience of the museum enters the visitor's narrative in parallel to the visitor's own, as a story that can be critically assessed", immersive exhibitions create a first-hand, emotionally affective experience, entering the visitor's own self-narrative. This implies that discursive and immersive exhibition design can be used as complementary strategies to promote transformative learning.

Overall, the main takeaway is transformative learning is a process that can be designed for. Each of the phases of transformative learning can be supported through design, leading to a series of challenges. In the specific case of museums: how we design a museum experience to raise awareness of the need for transformation? How can we support visitors' reflecting process? How can we design liminal spaces in which visitors can explore new behaviours? And finally, how can we design for experiences that promote lasting transformations?

It is important to note that transformative learning theories have been developed with adults. All in all, we have established the importance of developing Futures Literacy, and the precise positioning of museums that allows them to transform the lives of their visitors. But the question is, how can we create a transformative experience for *children*, showing them they have the power to influence the future?

## Children's learning in museums

If we consider transformative experiences as learning processes, then a better understanding of how children's learning in museums occurs is necessary. Falk and Dierking (2000) identified ten key factors that influence learning in museums, what they called the Contextual Model of Learning (Fig. 2—3). These factors were split into four categories: personal context, sociocultural context, physical context and time. As the authors themselves state, this model is "an effort to simultaneously provide a holistic picture of learning while accommodating the myriad specifics and details that give richness and authenticity to the learning process".

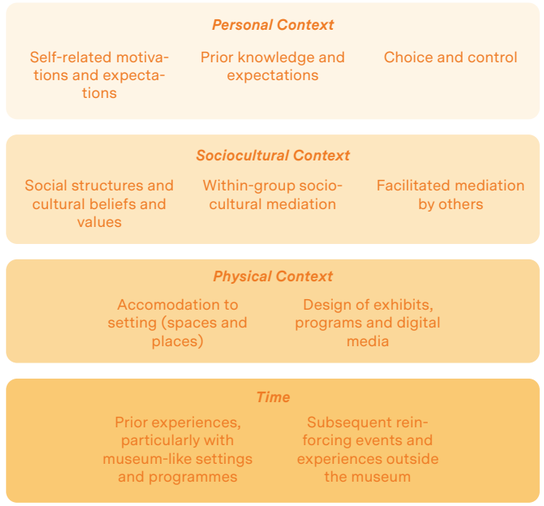



*Figure 2–3. Ten key influencing factors of learning in museums. Falk & Dierking (2000)*

Even if learning is a very specific, individual process, much research has been carried out trying to find out how it occurs and how best to facilitate it. In regards to children's learning specifically, the findings of Anderson et al. (2002) further support the idiosyncratic nature of learning. Even so, they identified several effective mediators of children's learning, namely: large-scale exhibits, kinesthetic and/or tactile experiences, story-based experiences and guided theatre-based facilitation. Furthermore, they suggest that children replicated learned behaviours in museums at home in instances where those behaviours are hands-on and "embedded within children's familiar culture and contexts".

These findings seem to suggest that a focus on immersive experiences for children is preferrable over discursive ones; as Sitzia (2016) states, "regardless of whether it is there in the first place, visitors always reconstruct some kind of narrative which will impact the meaning-making process". The fact that the central user group of the Co-Learning Expo will be in their concrete operational development stage (Piaget, 1964) further supports this theory, as this means children are most successful in thinking logically with the support of concrete materials.



Furthermore, Andre et al. (2017) established interactivity as an essential factor of children's learning in museums. (Fig. 2—4). They mainly differentiated between child-adult/peers interactivity (human-guided experiences, dialogues with parents or other children), child-technology interactivity (where interactive technologies act as facilitators) and child-environment interactivity (children's free interaction with objects in the museum). Overlap in these three categories was also observed.

Furthermore, they identified "a shift from child-centred to family-centred" focus in children's learning in museums. This was further defended by Wolf & Wood, who remarked that parents and caregivers play a crucial role in children's learning experiences in museums. Open-ended questioning from parents has showed to increase children's learning; in terms of strategies that facilitate learning, scaffolding merited a special mention. Scaffolding is a process in which abstract and complex ideas are introduced in very concrete and simple terms and progressively built up. Additionally, it involves simplifying concepts and encouraging learners, offering support and guidance, in order for them to successfully comprehend an idea or complete a task. Parents often scaffold many life situations for their children, providing understandable explanations. Museum experiences can also be designed with this process in mind.

To conclude, although children's learning in museums depends on many factors specific to each child, several strategies have been found to be generally effective. These strategies primarily involve supporting interactivity, be it with adults, peers, technology or the museum's own environment. Overall, the importance of scaffolding to make contents accessible to children is highlighted, which adults tend to do naturally. Knowing this, an effort to support scaffolding and interactivity should be included in the design of the Co-Learning Expo.

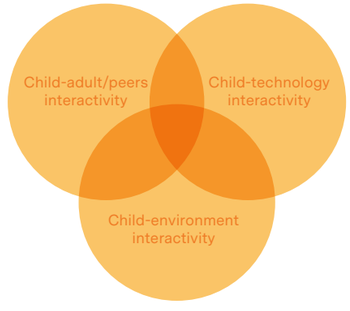



*Figure 2–4. Framework of facilitating strategies and activities in children's learning in museums. Andre et al. (2017)*

## MAIN INSIGHTS

Transformative experiences are those that force someone to examine and change their perspective on a certain issue, altering one's self-narrative; transformative experiences are learning processes (Gaggioli, 2016).

A transformative learning process roughly consists of awakening, reflection on current behaviours, experimentation with new ones, shifting of priorities and integration of the new perspective (Mezirov, 1978; Nohl, 2015).

A transformative learning process roughly consists of awakening, reflection on current behaviours, experimentation with new ones, shifting of priorities and integration of the new perspective (Mezirov, 1978; Nohl, 2015).

In order to facilitate children's learning in museums, interactivity (child-adult/peers, child-technology and-or child-environment) and immersive experiences are key (André et al., 2017; Sitzia, 2016).

# Methodological foundations

The theoretical foundations of this graduation project have been established through desk research. However, the general insights it provided needed to to be contextualized. This was done in order to take into account the specific characteristics, perspectives and values of the users and other stakeholders involved in this process. As a result, the design guidance this project aimed to offer could be tailored to this concrete case.  This section will discuss the methods that were applied when doing research with users. Further description of user research activities will be found in the following chapter.

As has been previously explained, the Co-Learning Expo aims to be a co-designed, participatory exhibition. This matches the continuous development in the discipline of design, which has become progressively more collaborative throughout its history. Following the tradition of Scandinavian Participatory Design, design processes in which users and other stakeholders are intentionally involved are becoming more common. Additionally, if we look at design as an act of creation, then we can also say that design as a field is always dealing with that which does not exist yet — that is to say, the future. It is no coincidence, then, that there are several different design methodologies which attempt to co-create the future. Three of these methodologies set the base for this project and will now be introduced.

## Participatory Design

The term Participatory Design is often used to refer to design processes in which end-users (and sometimes other stakeholders) are actively involved in one or more of the phases. The aim of such a process is to develop products, services or experience that better fit the users' needs, through applying their knowledge and experience (Interaction Design Foundation, n.d.). The users can take on different roles, — such as informants, co-designers, evaluators or even protagonists (Iversen et al., 2017). These vary  depending on the diverse stages of the design process, as well as the degree of involvement of the participants.

Participatory Design (PD) emerged in Scandinavia, as a response to the irruption of new technologies in the workplace. Its main goal was to allow workers to have influence on their own working conditions, as well as support the ideal of workplace democracy (Iversen & Smith, 2012). PD means to make the values of the user group explicit, in order to design relevant alternatives; this is especially important to allow the voices of minority groups to be heard. However, this critical and political tradition at the core of PD was eventually eclipsed by the simple profitability that resulted from applying it. In any case, many support that PD should enable people to become aware that they have a choice in the development of new technologies (Bødker, 2003).

In much of the same spirit as PD advocates for users being involved in design processes, participation of the public in museums has been widely called for. Freedman (2000) described the shift of museum's roles in the last century, from being safekeepers of knowledge for the elites towards sharing with the public. In her book The Participatory Museum (2010), Nina Simon defends that cultural institutions should not only allow but stimulate active engagement from visitors. She goes on to distinguish four levels of participation museums can embody: contributory, collaborative, co-creative and hosted (Fig. 2—5).

This framework serves as a good example of what participation can look like related to museum experiences. In the following section, PD with children specifically will be delved into, with a focus on co-designed museum experiences.

| | *Contributory* | *Collaborative* | *Co-creative* | *Hosted* |
|---|---|---|---|---|
| ***Commitment to community engagement*** | Commited to helping visitors and members feel like participants with the institution | Committed to deep partnerships with some target communities | Committed to supporting the needs of target communities whose goals align with the institutional mission | Committed to inviting community members to feel comfortable using the institution for their own purposes |
| ***Control wanted by the museum over the participatory process and product*** | High. Participants follow the museum's rules of engagement and give them what they request | Staff controls the process, but participants' actions steer the direction and content of the final outcome | Some. Participants' goals and preferred working styles are as important as staff's | Low. Participants can produce what they want as long as they stay within the museum's rules |
| ***Institution's relationship with participants over the project*** | The museum asks for content and participants provide it, following institutional rules | The museum sets the project concept and plan, and staff members and participants work together to realize it | The museum provides participants with the tools to lead the project and then supports their process | The museum provides rules and resources, then gives participants free rein |
| ***Participants and their commitment to the project*** | As many participants as possible, engaged briefly during a visit | Participants mostly have the explicit intention of engaging in the project | Intentional participants are sought out and are dedicated to seeing the project all the way through | Participants are ready to manage and implement the project on their own |

*Figure 2-5. Types of museums according to their engagement with participation. Simon (2010)*

## Participatory Design with children

There has been quite some work done in Participatory Design with children. This might stem from the fact that children are a target group with very specific needs and ways of looking at the world, which adults might find hard to understand. PD aims to give children a voice in the design of products or services meant for them. Participatory design processes often have the (primary or secondary) goal of empowering children; what empowerment can mean in this context will be discussed in a later section.

They way in which children are involved in a PD process can vary. There has been much discussion on what these roles could or should be, with some authors advocating for children as leaders or "protagonists" of the design process (Iversen et al., 2017). Still, in many (allegedly) co-design processes, children are given the role of informants or evaluators. As Schaper et al. (2018) state, "children's roles in the design process are strongly influenced and determined by the stakeholders' views on childhood and their expectations of children's skills and cognitive capacities". This reveals an implicit conflict in PD with children. Although one of its aims is to empower children, this empowerment is initiated and managed (or even restricted) by the designers. This contradiction will be expanded upon when we discuss children's empowerment.

The literature concerning the involvement of children in the co-design of museum experiences shows examples where the institutions coming up with participatory initiatives are those related to contemporary art (Bryant, 2011). In these instances, children are often given the responsibility of curating an exhibition by selecting artworks from the collection of the gallery or museum, and in some cases deciding also how to display them (Bryant, 2011). However, the outcome of the design process tends to be a static exhibition.

When it comes to co-designed interactive museum experiences, a few case studies can be found. They sometimes involve children or teenagers both in ideation and concept testing (Iversen & Smith, 2012; Césario & Nisi, 2022); in other cases, children act as informants in the design process (De Franco et al., 2019). Still, it could be argued that the children being empowered are those participating in the design process — not so much the visitors of the exhibition. Although the final result might be more relevant to visitors because of having been co-designed with children, other children might not even be aware that this is the case.

There are also many cases of co-designed museum experiences for children that are not reflected in the literature. Three of these have been selected as particularly interesting references, for various reasons: Young V&A, from the Victoria & Albert Museum, De Tentoonstelling from SMAK Gent and the Kinderbiënnale of the Groninger Museum.

*Figure 2–6. Young V&A (2023)*

*Figure 2–7. De Tentoonstelling, SMAK (2021)*

*Figure 2–8. Kinderbiënnale, Groninger Museum (2021)*



Young V&A is the new, re-designed version of the old V&A Museum of childhood, located in London's metropolitan area. Co-designed with children and made for them, this museum's core mission is to be a space for children's creativity. Self-described as a 'doing museum' (V&A, 2023), Young V&A aims to be a highly interactive space where children can express their ideas and design what they want. This goal, as well as their notably participatory process, makes Young V&A the most revelant referent for the Co-Learning Expo. It is also an example of a co-creative museum (Simon, 2010).

SMAK (the Municipal Museum of Contemporary Art of Ghent, BE)'s De Tentoonstelling is another interesting case to review. More than 400 children and teens worked together to design an exhibition, selecting artworks from the museum's collection and coming up with creative ways to display them (SMAK, n.d.). This would be an example of collaboration in a museum, according to Simon's framework.

Finally, the Kinderbiënnale of the Groninger Museum, located in Groningen, NL. Hosted every two years, it is described as 'a presentation of contemporary interactive art' (Groninger Museum, n.d.). It is developed with a team of children ambassadors, who help brainstorm ideas for the exhibition, do user tests, and act as the face of the biennale. The finished result is a series of interactive installations developed by different artists. This is another instance of a collaborative museum.

Having reviewed these cases, and looking at Nina Simon's framework for participation in museums, one question arises: how would the Co-Learning Expo be positioned? As was previously mentioned, many museums empower the children participating in the creative process, but not necessarily those visiting the exhibitions. However, what the Co-learning exhibition at Nieuwe Instituut is trying to achieve goes beyond this. Children's empowerment is not only a (desired) by-product of their involvement in the design process, but also the intended impact on the visitors.

Children's empowerment can be achieved by going further than creating an interactive installation: making it participatory instead. This means that visiting children should be encouraged to share their ideas and allowed to have some influence over the exhibition. Unlike traditional museum experiences for children, the Co-Learning Expo does not primarily aim to teach children something, but to learn something from them as well. In this way, it fits into a little-explored segment in what has been done to date in relation to children's empowerment through museum experiences. This is therefore a great opportunity to do novel work in this field through the Co-Learning Expo. At this point, children's empowerment has been mentioned multiple times in this report — but what does it actually mean? In the following section, this concept will be unpacked.

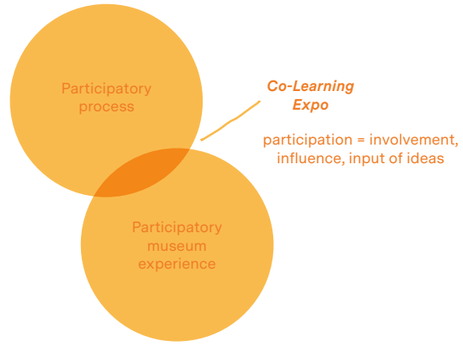



*Figure 2–9. Positioning of the Co-Learning Expo. Own creation (2023)*

## Children's empowerment through Participatory Design

There is much talk of empowerment in the Participatory Design community; it is often listed as one of the main goals of PD projects. However, what this word means has been left open to interpretation, as if the concept of empowerment was self-evident (Kinnula et al., 2017). Originally, the Scandinavian PD tradition focused on empowering workers by giving them a voice, with a more democratic workplace being the desired outcome. Slowly, the focus of the discourse shifted from the political towards the ethical considerations of design processes. Still, this prevalent notion of empowering users has inspired much of the work done in the Child-Computer Interaction (CCI) community. But *what* is empowerment and *how* does it happen? Kinnula et al. (2017) identified five main views on empowerment in the literature regarding co-design with children: what they called mainstream, critical, democratic, functional and educational empowerment.

The mainstream view sees empowerment as a direct result of influence in decision-making in the design process, with the ultimate goal to improve workplace cohesion and/or productivity. In PD processes with children, this means the "permission" to contribute to design decisions is given to the children by adults (the designers, mainly, or their teachers). Similarly to the mainstream view, the functional view sees empowerment as providing tools that extend users' capabilities, much with the same goal of efficiency. In contrast, the critical view of empowerment would be against describing both of these "empowerment" cases as such, since the initiative behind children's involvement continues to be top-down. In order to be qualified as truly empowering, their participation in a design process should be initiated by the children themselves. The democratic view of empowerment is quite similar to the mainstream view (empowerment as decision-making power), but its aim is to make design processes ethical, instead of focusing on accomplishing management goals.

Finally, there is the educational view of empowerment, which has been identified as the most relevant for this project. Empowerment, in the educational sense, is a direct result from providing users with the opportunity to learn and develop skills they will need in the future. This "preparatory" empowerment of sorts is especially relevant for PD processess with children, who are in a way readying themselves to "become full members of society" (Kinnula et al., 2017). This view of empowerment is very closely tied to the concept of literacies — such as, coincidentally, Futures Literacy.

> *D.R. – The experience should be educationally empowering for children, allowing them to learn or practice skills that are relevant for their future.*

To conclude, there are many different ways that empowerment can be defined, in relation to the manners in which design processes are managed and what the motivations behind them are. However, defining which type of empowerment one is aiming for can provide clarity to the designers and strengthen a project's narrative. Otherwise, we run the risk of empowerment becoming "merely a slogan when designing for or with children" (Van Mechelen et al., 2021). In this case, educational empowerment is highlighted as the primary goal of the Co-Learning Expo. Children should come out of this experience feeling like they have skills to face the future and the capacity to develop them even further. This core motivation was kept in mind not only when formulating the design guidelines, but also when designing the participatory activities in the design process.

### MAIN INSIGHTS

Participatory design referes to the involvement of end-users in design processes, in order to generate outcomes that better fit user needs.

Participation in museums can have four levels: contributory, collaborative, co-creative and hosted (Simon, 2010).

There are opportunities to be explored in the overlap between co-designed museum experiences and participatory museum experiences for children; this is where empowerment for the greatest number of children can be achieved.

The focus of the Co-Learning Expo should be in educational empowerment, described as building skills and competencies to prepare for the future (Kinnula et al., 2017).



## Speculative Design

Speculative Design (SD) is a critical design approach that aims to encourage people to analyze and reflect on the present through the imagining of possible (preferrable or not) futures; it "attempts to anticipate the future and at the same time helps us to re-think the present" (Mitrović et al., 2021). This entails identifying certain trends or developments in different fields (social, technological, environmental) and extrapolating them into the future — what is commonly known as futuring (Smith & Ashby, 2020). Then, a scenario is created and sometimes communicated through the design of an object that would exist in that future. The existence of an artifact / service prototype with which people can interact is what sets SD apart from design fiction; speculative artifacts are usually stand-alone pieces situated in a world that is not elaborated on (Dunne & Raby, 2013). The main purpose of SD is to confront people with one of the futures that could derive from our present. Therefore, it could be argued that SD is one of the many ways of exercizing Futures Literacy.

A framework that is often used within the Speculative Design community, and which can serve as a tool for reflection, is what is known as the Futures Cone, created by Hancock and Bezold in 1994 (Fig. 2—10). This model represents the different ramifications that the present can have when projected into the future — creating a whole fan of futures. Based on their likelihood, these can be categorized as probable, plausible or possible futures. When the Futures Cone is used as a mapping tool, the usual follow-up question is: what are the preferrable futures, and how likely are they to happen?

Design Fiction and Speculative Design approaches often develop a scenario based on plausible or possible futures, in order to spark discussion about the present moment. This representation of the present as singular, not taking into account the diverse realities that different social groups live, is one of the main critiques against the Futures Cone model (Howell et al., 2021). However, its usefulness lies in its simplicity, which makes it an effective way to communicate speculative design to people who are not experienced in futuring.

The origins of SD can be traced back to the Royal College of Arts (UK). There, interaction design lecturers such as Anthony Dunne, Fiona Raby and James Auger developed a new kind of critical design together with their students. Speculative design does not mean to create consumer goods or services; it is more concerned with the ideas, fitting into the domain of conceptual design (Dunne & Raby, 2013). This means the speculative artifacts produced within this period were most often museum pieces. More or less ambiguous, they stemmed from the (highly educated) designers' views on society, technology and even politics. In the origins of the discipline there was a clear division between those speculating - the (often highly educated, upper-middle class) designers - and those on the receiving end of the design, its audience (Farias et al., 2022).

Eventually, the value of making SD collaborative — what is currently known as co-speculation — started to become more evident. As Farias et al. ask, "if speculating about the future liberates the imagination with potentially emancipatory implications, why should that task remain exclusively

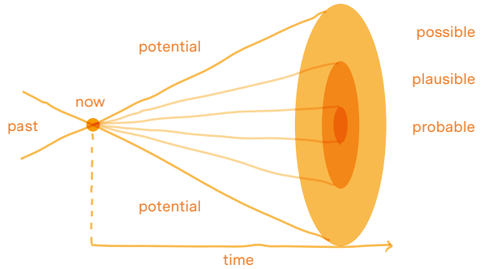



*Figure 2–10. The Futures Cone. Hancock & Bezold, 1994.*

at the hands of designers?" In co-speculation, often equal (if not more) weight is given to the process as to the outcome. The collective sense-making and discussions sparked through co-speculation are an end in itself. They also provide very useful insights; not only do the participants' values become more explicit, but they can also come into tension with others'. Co-speculation is one way that SD can take into account the plurality of lived experiences. Moreover, through being involved in co-speculation processes, communities can become more futures literate — and eventually more resilient, as per the literature (Miller, 2018).

## Co-speculation case studies

Recently, some designers/researchers in HCI have started discussing the notion of co-speculation. However, there is not a clear definition nor a common practice. Farias et al. (2022) looked into Participatory Speculative Design (PSD) and how it had been carried out in case studies, in order to provide a starting point from which to analyze the types and degrees of participation in SD processes. They suggested 8 categories of participation along 4 levels: non-participation, involvement, collaboration and leadership (Fig. 2—11).

Furthermore, they identified some common challenges of involving users or other stakeholders in speculative design processes, namely reaching the right participants, deciding when best to involve them, and encountering resistance from stakeholders regarding the radical consequences of SD processes. This graduation project deals with the first two issues, with one added difficulty: children are not only a very heterogenous group, but they are also still developing the abstract thinking abilities needed for speculation. Schaper et al. (2018) warned against underestimating children's abilities, as this leads to their reduced agency in co-design processes — however, how can children's capacity to speculate be asessed in an unbiased way?

In the interest of forming a better understanding of how children have been engaged in co-speculation before, some case studies were reviewed. The selected cases had to fit the following criteria: participants 1) were children or teenagers (or in one case, young adults) and 2) were invited to imagine futures related to a relevant topic for them, through individual or group activities, primarily for the sake of imagining futures. This last criteria served to pick out cases fitting into co-speculation and not PD. Additionally, some of the cases fall into design fiction or generative research, since the criteria was process-based instead of outcome-based; this means they do not completely fit in Farias et al.'s framework. An overview of the case studies reviewed can be found in Figure 2—12.

In summary, these co-speculation processes carried out with children and youth show great diversity of topics and approaches. However, it is interesting to note they usually stay in the collaboration level of participation; children are never the ones initiating speculative design processes. In any case, these case studies served as indirect inspiration for the research activities with children carried out further on in this project, which aims to be itself a small contribution to the field of co-speculation with children.

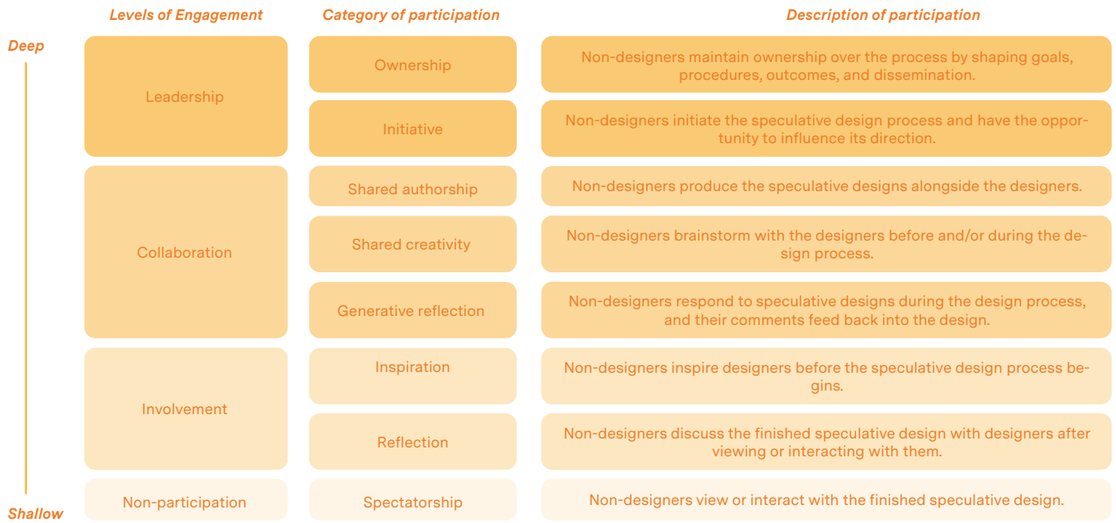



*Figure 2–11. Levels of engagement and categories of participation. Farias et al. (2022)*

| *Project name / ref.* | *Topic* | *Co-speculators* | *Activities / methods used* | *Participation level* |
|---|---|---|---|---|
| Nowhere to Now-here: Empowering Children to Reimagine Bully Prevention at Schools Using Critical Design Fiction (Ventä-Olkkonen et al., 2021) | Bullying in schools | Schoolchildren ages 7-12 | 1. Sensitizing in class. Home activities with parents, short interview. Personas, etc. Sending an email to a bully / someone being bullied<br>2. Ideation with toys an inspiration, thinking of "magical" uses then coming up with a scenario in which this gadget would stop bullying. Best-case and worst-case scenario, reflection critically as a group. The Miracle method: imagine the world after the disappearance of bullying<br>3. Roleplay / theatre play: putting on a show based on the scenarios and performing it.<br>4. Reflection and peer evaluation | Shared creativity |
| Visioning workshop for a sustainable future for Østerbro (Fincke & Sliwa, 2022) | Sustainable Development Goals, applied to a neighbourhood | Schoolchildren ages 9-10 | 1. Context scenario with illustrations<br>2. Mapping of the issue, coming up with futures in which the issue was solved<br>3. Newspaper of the future, to be filled in with events happening in that preferrable future | Shared authorship - children were given shared authorship of the published newspaper |
| From remembering to futuring: preparing children for the Anthropocene (Demneh & Darani, 2020) | Climate change | Schoolchildren ages 9-13 | Write, draw, show and tell (WDST) → future of the environment in 50 years, drawing in groups<br>"What do you think about the future of the environmentand climate change? What would the future of environment be like if you had the power to change it?" | Not fitting into the framework (there is no outcome since this is a study, not a design project) |
| Eliciting tech futures among black young adults: a case study of remote speculative co-design (Harrington & Dillahunt, 2021) | Society of Chicago | Black young adults ages 14-24 | Co-design workbook<br>Black mirror episodes as probes<br>Scenario-making in groups | Shared creativity - Not quite fitting into the framework (no outcome) |

*Figure 2–12. Co-speculation case studies, classified according to Farias et al. (2022)'s framework for participatory SD.*

## MAIN INSIGHTS

Speculative design aims to spark reflection about the present through anticipation of possible futures (Mitrović et al., 2021).

Although initially speculative design had very clear boundaries between designers and audience, in later years participatory speculative design has become more common. Four levels of participation can be distinguished: non-participation, involvement, collaboration and leadership (Farias et al., 2022).

Co-speculation with children has been explored in the literature in several diverse ways, mostly fitting into the collaboration level of participation.

# Contextmapping

Contextmapping (CM) refers to a set of tools and methods of what is known as generative research, developed by Sanders & Stappers (2012). Its purpose is to take a human-centered design research approach in the fuzzy first phases of design processes. The ultimate aim of Contextmapping is to generate empathy with the users by immersing in their context and gathering rich experiential data.

Contextmapping sessions can be referred to as collective co-creation, since they are usually carried out in a group setting. The purpose of this is to invite participants to share their experiences with one another — which pushes them to verbalize and elaborate on them.

How is Contextmapping different from other traditional design research techniques? It is generative research, which means participants do not only give verbal input to the researchers, but also make something themselves. The basis of this technique is the fact that through creative activities, people are able to express levels of knowledge they might normally find difficult to access. By making something and then explaining it, participants often reveal deeper, richer information — such as their motivations, values, fears, hopes and dreams (Fig. 2—13).

To access these hidden levels of knowledge, participants need to be immersed in the topic before the interview / session takes place. This is done through what is known as "sensitizing", which often consists on a short activity to be done at home by the participants. Through this activity, they are invited to observe the present, and afterwards recall and reflect on their past experiences regarding the topic of the research. Having done this, they are ready to express their wishes for the future during the session. This sequence of events is what is know as the Path of Expression, as it has been observed to best allow participants to verbalize and share their experiences (Fig. 2—14).

This model is very interesting to this project, seeing as the future-related parts of Contextmapping techniques could potentially be categorized as speculative — i.e. exercizing the Futures Literacy of participants. Therefore, knowing that this sequence is helpful in order to ground the speculation on the lived experiences of the participants is very helpful.

However, it should be said that these generic principles of Contextmapping generally have been postulated with adult participants in mind, and tested with them as well. Knowing this, how can Contextmapping techniques be carried out with children?

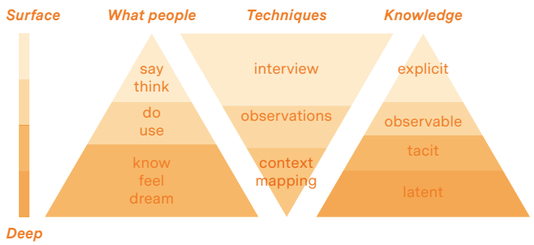



*Figure 2-13. Layers of knowledge. Sanders & Stappers (2012)*

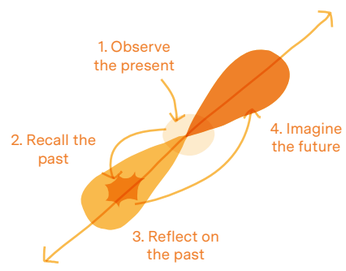



*Figure 2-14. The Path of Expression. Sanders & Stappers (2012)*



## Contextmapping with children

Several authors have explored the complexities of Contextmapping with child participants. Gielen (2013) identified the language skills of participants as an important limitation in Contextmapping activities, especially for younger children or those that prefer to express themselves in non-verbal ways. Since CM relies so heavily on verbalization, looking for alternatives was recommended when applying these techniques with children. Van Mechelen (2016) developed the GLID method, in order to analyze children's multimodal input (such as drawings and enactments).

Group dynamics also play a big role in children's participation in CM activities. Gielen (2013) described shyness as a factor to consider, as well as several strategies to minimize its effects. These include creating mixed groups of extraverted and intraverted children, having some individual activities, and clearly expressing when spoken participation will be expected. Gielen also recommended icebreakers as a way to ease children into CM, and warned of the inevitability of children feeling the need to perform 'well', especially in individual exercises. Van Mechelen et al. (2014) elaborated on other problematics in group dynamics, such as free riding, not taking the assignment seriously and outcome deffiCiencies (such as aggregated ideas as a result of children's hesitancy to critique others' proposals).

Since this project intends to engage children in imagining futures, it was interesting to learn how they apply their abstract thinking abilities in CM sessions. Van Dorp (2010) found children's abstract thinking to be linked to their language skills, especially in younger children. However, she postulated that higher levels of abstract thinking did not necessarily correspond to richer results.

Overall, CM activities have been successfully carried out with children. However, there are many challenges that would not be present with adult participants, and many unforeseen situations can arise. In any case, some of these complexities have been identified beforehand and were kept in mind when designing CM sessions for this project. However, keeping an open mind and being able to improvise during the session are crucial (P.J. Stappers, personal communication, April 2023; M. Gielen, personal communication, April 2023).

## MAIN INSIGHTS

Contextmapping is a generative research technique, with the aim of empathizing with users by understanding their context and gathering rich data on their experiences (Sanders & Stappers, 2012)

Contextmapping with children presents some challenges in terms of children's abilities and social dynamics; it is important to keep an open mindset and be ready to improvise.

# Chapter 3. User Research: Diving into the context

Once the goal of this project was formulated, based on the opportunity identified in the literature — co-designing a participatory museum experience — it was time to explore the context hands-on. In order to make the process as participatory as possible, multiple stakeholders were involved: parents, teachers, and most importantly children. This chapter will relate the different research activities that were carried out, explaining the aim, methodology and insights gained from each of them.

## Interviews with parents

The first step in exploring the context was interviewing parents of children in the target group or slightly older (8, 9, 11 and 14 years old). The aim of these interviews was to make a first "rough sketch" of the context, as it were — setting the frame for the following research activities. As they were a first approach to the (very broad) topic of the project, these interviews consisted of quite open-ended questions. The main topics to be learned about were 1) children's knowledge of the future and their attitudes towards it, 2) children's ways of expressing their ideas, and 3) previous experiences in museums as a family and what activities children enjoy engaging in.

Three parents from different families participated in the interviews, which were carried out in English (two online and one in person) and lasted around 25 minutes. The audio was recorded and transcribed; afterwards, statement cards were created and clustered in order to detect patterns.

## Children's perception and attitudes towards the future

All parents mentioned a very distinct dychotomy between how their children perceive the short-term vs. the long-term future. Future events in immediate, tangible areas of their life (such as going to school, what to do on the weekend or the next holidays) are very easy for them to imagine themselves in. However, "the future" as a concept is distant and uncertain — the possibilities are so many that picturing them proves to be very hard for children. Whether this is in part due to their still developing abstract thinking capabilities remains a question, but would align with the literature on children's development that was reviewed (Piaget, 1968; Acuff & Reiher, 2000).

When it comes to what children know about the distant future, it soon became apparent that it is highly determined by what the adults around them discuss with them. This means first of all that children's perspective of the future is highly dependent on their parents' and teachers' views, and what they deem appropriate to be shared. In the case of the participants, this was easily identified. Whereas the most "activistic" parents saw their values reflected in their children's behaviour, others preferred to "let kids be kids", resulting in more "carefree" children. Schools were mentioned to also play a big role in teaching children about issues relating to the future, such as the energy and biodiversity crises. Generally, although this influence from adults was to be expected, it was important to remember when interviewing children in later stages.

*'Well, he's nine. And indeed, in school he does get information about... For instance, every spring it's the bees. And talking about the bees that we need more bees in the city. He's aware of the war in Ukraine... But it's all very abstract. It's not part of his particular life, which is a good thing.'*
*– Mum of Jan (9)*

*'From a very young age they are aware that we have to work against climate change, they hear it at home and they have also integrated it very much themselves.'*
*– Mum of Luna (8) and Bruno (11)*

*D.R. – The exhibition should avoid falling into popular imagery of the future, and should encourage children to think beyond it as well.*

When faced with these images of the future, the attitudes of the participants' children varied. They ranged from firm belief that all problems would be solved to concern about the severity of the issues to tackle, and slight skepticism. Between these four children, age was inversely related to optimism, but personality could also be an important factor. Still, collective effort and working together were mentioned multiple times as the ways forward.

In general, parents mentioned discussing issues like climate change with their children, usually as a follow-up conversation to being taught about them at school. One participant remarked that their child initiating the discussion himself resulted in significantly higher engagement. Based on these insights, something to keep in mind is children are frequently being talked to about the future in a serious tone, but they may not always want to participate in these dialogues.

## Children's ways of expression

The Co-Learning Expo is intended to be a space where children will feel encouraged to share their ideas for the future and offer their own perspectives. Understanding how children feel most comfortable expressing their ideas, and designing the exhibition accordingly, is therefore crucial. It was a very real possibility that children would not be able to verbally articulate what their preferred way of communicating is, which is why this question was asked to their parents instead. Despite not having consciously thought about it before, they could quickly identify their children's preferences.

A very relevant insight was that children like to express their ideas and opinions in different ways, and often have a strong inclination towards one of them. My hypothesis is this is mostly related to personality, since siblings with the same upbringing can have disparate preferences. This seems to be in line with Howard Gardner's Theory of Multiple Intelligences. Gardner (cited by Gardner & Hatch, 1989) states that intelligence is not a singular concept, but that humans posess several intelligences, which each individual develops in different proportions, so to speak. He originally identified seven intelligences (eventually expanded to nine), including linguistic-verbal intelligence, visual-spatial intelligence and body-kinesthetic intelligence.

In these interviews, the participants' answers reflected three different types of expression their children used, which I have named verbal/discursive, non-verbal/designerly and embodied/enacted. These expression manners closely relate to the three of Howard's intelligences mentioned before (Fig. 3—1). This suggests there could potentially be more; however, they were not observed in the participatory activities carried out within this project. The types of expression identified will be elaborated upon in this section.

*'Bruno – he reads a lot. So he is like 'you know, it is really bad and we need to do things'. [.] Luna takes for granted that we are going to solve everything, she is problem-solver. So she immediately says 'mum, I should donate my toys, or recycle them because then we use less plastic'. She looks for solutions, let's say.'*
*– Mum of Luna (8) and Bruno (11)*

*'She doesn't feel empowered for the encompassing solution, but she sees a role for herself, in either joining a movement or adapting her behavior.'*
*– Dad of Benthe (14)*

**Disclaimer**: all names of participants in this report have been changed to protect their identities. However, names were chosen over referring to them as 'P1' to show that they are real people.

***D.R. – In the exhibition, children should be able to express their ideas in the way(s) that comes most naturally to them.***

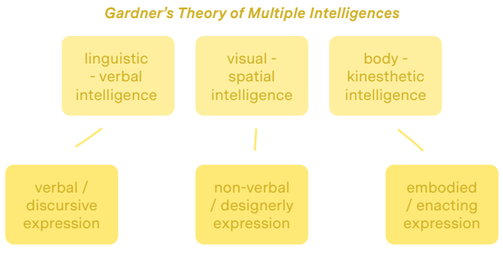



*Figure 3–1. Gardner's multiple intelligences related to children's ways of expression. Gardner (1989); own creation (2023)*



Children who express themselves in a verbal/discursive manner like to process information, form their own opinion, and afterwards share it with others, be it in a spoken or written way. In contrast, words do not have such an appeal to children who prefer non-verbal/designerly ways of communicating. They would rather show what they imagine than tell it, through drawings or maquettes. Finally, some children engage their entire body as well as their minds when expressing themselves — what I called embodied/enacted expression. They communicate their ideas by physically acting them out, as if they were a play.

*'He consumes, he reads so much, watches documentaries on YouTube, etc. And there he absorbs and absorbs, and after he tells you all the stories that he has seen and comments it. In the house he is the one that consumes and then he processes it and discusses it with us, he shares it'.*
*– Mum of Bruno (11)*

*'There are two sort of the mediums that she enjoys. So she does a lot with tape and found objects so making stuff with that. And she enjoys drawing a lot.'*
*– Dad of Benthe (14)*

*'So she really likes making and creating notes and ideas and making sketches, and she speaks of sketches and prototypes and all of these things'.*
*– Mum of Luna (8)*

*'Well, he's never been a really artsy crafter [..] he likes to enact. And since soccer is really his thing, then he enacts how he would then react if he made a goal. [...] Yeah, I think that would be more physical. So not in drawings or writing. That is not particularly his thing.'*
*– Mum of Jan (9)*

To visualize these different ways of expression, a diagram was made (Fig. 3—2). The thought behind it is that all children express in all three ways at certain moments, but most of them are most comfortable with one or two of them. This would mean they would be placed closer to one or two of the corner points of the triangle, and further away from another. The more centered they are in the triangle, the less obvious their preference is. The framework created was used as a tool throughout this project, in order to map out the inclinations of the children participants.

Something to note is non-verbal/designerly expression is what is traditionally considered to be "creative". This became apparent during the interviews, where parents of children with a preference for the two other types did not necessarily consider their children to be creative. Technology was also mentioned as a facilitator of children's creativity, as most of them played worldbuilding videogames or designed their own games with friends on online platforms.

However, all children (all people, for that matter) are creative (Sanders & Stappers, 2013; Baran et al., 2011) — but we are not always creating the space for their creativity to be appreciated. This is good to keep in mind when developing the Co-Learning Expo.

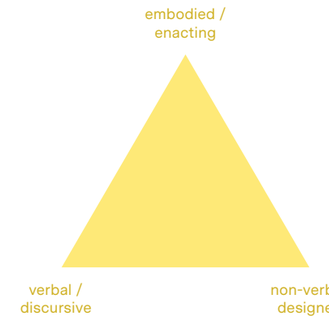



*Figure 3–2. Children's ways of expression, framework. Own creation, 2023*

## Family experiences in museums

Museums can act as both a place for learning and leisure. Having this double role makes them a very attractive option for families to visit as a unit. This translates into most museums having special exhibitions or programmes catering to children and their families. Since the Co-Learning Expo aims to become the highlight of Nieuwe Instituut for families, gaining a better understanding of how they experience museum outings is important.

When asked to describe the usual flow of museum visits, it became clear that no two families are the same. The families with younger children indicated they tend to stick together, and often the children take the lead in exploring the museum, leading their parents through it. With minor nudging from the parents (who sometimes decide the starting point or explain something about the exhibition), children's initiative and interest guide the family. For them, part of the enjoyment comes from showing their parents how much they know, or are learning, about the topic of the exhibition they are visiting. As they grow older, children might become more independent and create their own journey separately from their parents.

Regarding what attracts children's attention in museums, the response was unanimous — interactive elements. Any installation where touch is encouraged rather than discouraged, and other senses other than sight are stimulated is an immediate hit. Activities in which they can make something were also described as exciting, especially for children who prefer non-verbal/designerly expression.

Unfortunately, not all museums experiences are entirely positive for children. Oftentimes, the presence of many people they do not know can make them feel shy or slightly uncomfortable. In these cases, they might fall back into a more passive role, thus engaging less with the exhibitions. One participant mentioned their technique when this happened was to encourage their children to take the lead again, by asking questions: where do you want to go now? What do you want to do? By being given the power to decide and follow their instincts, children gain the confidence necessary to immerse in the experience again, overcoming their reservations.

Another aspect that might make museum experiences less satisfactory is overstimulation. In the presence of too many stimuli, participants mentioned their children getting overloaded and eventually drained. As one participant explained, children do not know so many things yet. In museums, adults can easily build on top of existing knowledge when they learn a few new facts. However, for children the proportion of information that is completely novel to them is much greater. Being mindful of this could enhance children's experience of the Co-Learning Expo.

All in all, the Co-Learning Expo has great potential to be a very positive experience for families. Several aspects that should be paid attention to when designing it have been identified, and will eventually be translated into design requirements (Chapter 4).

*'They almost always go through the museums together. Both of us go after them, and they are together creating their whole story of what they are seeing, let's say'.*
*– Mum of Luna (8) and Bruno (11)*

*'I think I decide where we start, which depends on the building and the crowds. Like with Naturalis, I said we're going to take the elevator to the top and then walk down, and then they can lead, you know, which rooms or where they want to pause. But they kind of set the pace. [.] But no, we stick together. Or at least with the youngest, yeah.'*
*– Mum of Jan (9) and Rick (15)*

*D.O. – Children could have a tangible takeaway from the experience, so they can show their parents or other family members.*

*D.R. – The design of the exhibition should be inviting and stimulate children to explore, without feeling constrained to a specific route.*

*'Because sometimes we think we can do much more than we actually can. I mean, they absorb like sponges. So of course, you can see something and move on, but for them it's already 1000 bytes of information. So you are looking at them and suddenly that's it, they're done, they are collapsing [laughs]'.*
*– Mum of Luna (8) and Bruno (11)*



***Superstraat, Wereldmuseum Rotterdam***

The mum of Jan (9) and Rick (15) mentioned Superstraat at the Wereldmuseum Rotterdam as a remarkable museum experience for her children. Jan, who prefers embodied / enacting expression, was able to physically explore the exhibition and create his own stories with other children. In the meantime, his older brother, who enjoys non-verbal / designerly expression more, was able to learn and practice some handlettering.

*Figure 3–4. Learning handlettering at Superstraat at the Wereldmuseum*

*Figure 3–3. Superstraat at the Wereldmuseum*

An interesting aspect to highlight in this experience is the fact that it is built to the size of the children. This might seem like an obvious design choice, but also had the effect of giving children the freedom to explore spaces where their parents cannot follow them.


*Figure 3–5. Interactive installations at the NEMO Science Museum*

***NEMO Science Museum, Amsterdam***

The Mum of Luna (8) and Bruno (11) referenced the NEMO Science Museum in Amsterdam as one museum their children love, but also one that exhausts them. She retold an instance of spending several hours in the museum, getting through a few stations, and their children 'collapsing' at the amount of stimuli and new information.

*Figure 3–6. Floorplan snippet of the NEMO Science Museum*

*Figure 3–7. Family visiting the muZEEum*

***muZEEum (Maritiem Museum Zeeland)***

The mum of Jan (9) also spoke about the muZEEum (or sea museum, as she called it). She remembered a specific installation with a wall of drawers filled with objects, with different knobs depending on the content. Jan really enjoyed the element of discovery and paid a lot of attention to what he would find inside each drawer.

*Figure 3–8. Family visiting the TextielMuseum*

***TextielMuseum Tilburg***

The dad of Benthe (14) mentioned the TextielMuseum as one of her favourites. Since she loves making things, she enjoys learning about the production processes of textiles and getting to try them out herself.

*Figure 3–9. Learning about production processes in the the TextielMuseum*



# Interview with a teacher

While parents are experts on their own children, schoolteachers come into contact with hundreds of children throughout their career. Knowing this, I set out to interview at least one teacher, in order to learn from their expertise and contrast my findings thus far. The main questions in this case were not drastically different than those asked to parents. However, since a rough conception of the context had already been formed, it was possible to go deeper into detail. Additionally, the teacher's perspective complements the parents' (for example, when it comes to museum experiences).

One teacher of children between 6 and 12 years old in a Montessori school was interviewed. The interview was conducted online, audio recorded and transcribed, and lasted for 40 minutes. As with the previous ones, it was analyzed by creating statement cards and clustering them.

Regarding children's perception of the future, the participant had some very interesting insights. She had facilitated a philosophy exercise with her class around the topic of the future a few weeks before the interview. In it, children were asked what were their dreams for themselves and for society. Based on their answers, she had identified two types of responses. Some children focused on the emotions they would like to feel, while others described the physical environment they would have around them.

She also had observed that whereas some children presented no difficulties thinking of their dreams for society, others found it difficult or showed no interest in it. Knowing these children, she was able to identify that those who struggled with the exercise were the ones dealing with troubled home situations. The abstract future of society feels obviously very distant for kids who cannot, for example, take their daily meals for granted. This raises a big concern, which echoes the recurring debate within the speculative design community: is futuring an activity only the priviledged can afford to engage in? (Dunne & Raby, 2013; as cited by Farias et al., 2022) And if it is not, then how can we as designers ensure its accessibility?

When asked how her students felt about the future, hope and hopelessness were both mentioned. Some children see a role for themselves in the future, creating the solutions to the issues we are facing. However, they generally struggle to see what they can contribute now, while they are still young. This presents itself as a challenge to be tackled by the Co-Learning Expo: how can we connect the abstract future with concrete actions that can be taken already, even by children?

*D.R. – The overall tone of the exhibition should be hopeful; however, appropiate weight should be given to children's concerns and fears about the future.*

*'There's the kids who really are more on the material side. So they want to have enough money, house, everything. And there are kids who are thinking more abstract and think about, you know, being healthy, feeling good or happy and saying that they don't need much stuff for that.'*

*'It's difficult, you know, if you don't get breakfast in the morning and you go to school and you don't feel very well, then that's more worrying than other bigger issues like climate, which is quite abstract and difficult to realize or to think about what could your role be to help that issue.'*

*'A lot of kids are worried about it [the future]. And I think mainly because they have the idea that as a child, what can you do? And of course, there are a few kids who are seeing who think, yes, it would be possible to do something. And what we try to do with our projects is to make it smaller, to make it in a way that says 'everyone can do something, and also the smaller things are important'. And also 'you as a kid could do something'.'*

Children are full of ideas, and how best to encourage them to share is something schoolteachers are experts in. The participant mentioned some of her students preferring to write or talk, others having an inclination for drawing, and others expressing themselves the most through active games. Additionally, she explained that including a combination of these different activities in lessons had proven to be very beneficial for the students, giving all of them a chance to show their potential. For example, she told about a lesson format where the students would read a book, then work in groups to make an object that would solve a problem related to the plot. Finally, there would be a presentation or a small dramatization by each group in front of the class.

The participant recounted also how, once she gets to know her students for the year, she can identify what are their preferences of expression. From there, she affirmed she encourages the children to take on roles that would not be their first choice — with surprising results in many cases. She also mentioned creating groups taking this into account, putting together children whose strengths would complement each other.

Finally, in relation to her experience visiting museums with her classes, the participant retold how enthusiastic her students are about it. She remarked how being able to experience something with multiple senses, instead of just listening or seeing something, made them a lot more excited to learn. In regards to the flow of the visits, she described most museums appointing a tour guide — in which case the role of the teachers is to accompany and keep track of the children. Therefore, the perceived big differences between family and school visits are confirmed.

All in all, this interview served to verify and add detail to many of the insights gathered while talking to parents in the previous phase. A summary of the conclusions of these interviews can be found in Figure X.

*'When I have a class of children for a whole year then of course you know the kids. So what you do is you try to give them the opportunity to have different roles. Because that's the way how to learn. It's by doing things you cannot do yet.'*



## MAIN INSIGHTS

Children can imagine abstract futures, but they struggle to connect them with their present circumstances and actions.

Children's images of the future are highly influenced by what adults tell them.

Children's imagined futures have a direct correlation to their present; children with difficult home situations might find it harder to think of the future in a society-wide scope.

Children are generally optimistic about the future, seeing a role for their generation to bring about some change together.

Many children express worries about the future; one way to help them deal with this is to show small actions they can do that can have an impact on these big issues.

Children like to express their ideas in different ways: verbal/discursive, non-verbal/designerly and embodied/enacted.

Adults can have a biased, 'old-school' perspective of what children's creativity is, associating it with analog, non-verbal/designerly expression.

Children often have a preferred way of expressing themselves; however, they can still improve their abilities in other types of expression. Children who express themselves differently can complement each other.

Children often like to lead their families around museums, creating their own adventure.

Part of children's enjoyment in museums is in sharing what they know or what they are learning with their families.

Interactive and immersive elements in museums are very attractive to children.

Multi-sensory experiences in museums are very attractive to children, as they provide a very different way of learning.

Children can easily get overstimulated in museums, due to the amount of information available to them at once.

# Design study with children

Children are a notoriously difficult user group to get in touch with. That was  one of the main reasons why research activities with them were not carried out earlier in the project. However, waiting to interview children until I had talked to parents and teachers was a conscious decision as well. It proved to be very useful, since it allowed me to plan the sessions with children taking into account the insights gained thus far.

At this point in the research, a general understanding on how children think of the future had been formed. Still, confirmation was needed from children themselves. Aside from finding out *how* they perceive the future, it was interesting to learn *what topics* they associate with it. This information will be a starting point to come up with concepts for the Co-Learning Expo (since, as mentioned before, it should consist of multiple stations around different topics).

Two different activities were carried out with children, the first acting as a pilot test of sorts for the second one. They will be described in the following sections.

## Pilot sessions

These sessions were the first contact with children in the user group, as well as slightly older. Through them, the aim was to ratify the insights that had been gained by talking to adults, and observe children's capacity to speculate in action. The other desired outcome of the sessions was to be able to identify a number of topics that were mentioned in relation to the future. In order to do obtain the richest data possible, generative research techniques were used — in this instance, collage-making.

During these sessions, children were asked a few open questions about the future. Afterwards, they were given a pre-selected set of ambiguous images and requested to make a collage illustrating what they thought the future would be like. They were also encouraged to think of things that would happen they would either appreciate or dislike.

Three children (aged 8, 13 and 13) participated in the sessions. They were designed to be done in a group, following the suggestion of Mathieu Gielen, an expert in co-designing with children. The reasoning behind this is that children can sometimes feel intimidated by adult researchers, and will find it easier to talk to their fellow children. This proved to be true in one of the sessions, carried out with two siblings. The youngest was encouraged to speak by (and directed most of his answers to) their sibling. Due to a last-minute withdrawal, the second session was done with only one participant — however, thanks to their outspoken personality, this presented no issue in getting their input.

The sessions were carried out in English and Spanish, which the children were fluent in respectively, and lasted approximately 1 hour and 15 minutes each. They were audio-recorded and later transcribed, finally extracting the most relevant quotes. The collages made by the participants were photographed and stored safely.

*Figure 3–10. Pilot session set-up at Nieuwe Instituut*


*Figure 3–11. Marco's (13) vision of the future*


*Figure 3–12. César's (13) vision of the future*


*Figure 3–13. Ahmed's (13) vision of the future*

When they were asked what the future would be like, the participants immediately mentioned issues like climate change and war, as well as futuristic architecture and space travel. All of these images of the future very closely match what they are taught in school, or else encounter in the media they consume (Star Trek and WALL-E were mentioned, for example). However, when asked how they wanted their lives to be like, they struggled to imagine it.

Something to note is the participants talked about worrying global issues in a matter-of-fact way. Even when social instability or the shortage of food and water were being discussed, they kept a nonchalant tone. It remains a question whether this detatchment is caused by their difficulties picturing how these issues affect them or viceversa. Could this emotional distance be a innate protection mechanism, in order to avoid a great deal of psychological stress?

Surprisingly enough, although all participants discussed dire situations as very likely to happen, their attitude was still hopeful. They were able to imagine futures in which both humans and nature thrived, and innovation resulted from this state of wellbeing. Heritage and "old things in museums" were talked about as something to protect and learn from.

Generally, participants saw a role for their generation in helping bring about positive change. Through small actions and education, they expressed believing in being able to make a difference. However, emphasis was also put on adults and governments to take both responsability and action.

Although this was what they did say, it is important to mention also what they did not want to talk about. None of the participants seemed willing to delve deeper into the so-called "bad futures" and how they felt about them. In this respect, avoidance was the primary response, which did not succeed in covering sadness and fear. This raises the question of how much of their positive responses was the result of "inspirational" messages they hear from adults.

*'I also think that the world's gonna be prettier. I think people are going to care more about the environment, because people already care about the environment. But I think more people will care about the environment, because then they will become parents. And then they will tell their children about things and they probably will increase. So it will be a lot cleaner and more eco friendly. I think there will be more nature. And I think people will be happier.'*
*– Marco (13)*

*'We have to do something so this does not happen. I think in this generation everyone is following TikTok and everything that happens. So if we have someone that says what needs to be done to have a good impact, then I think it can happen and us young people can make it.'*
*– César (13)*

*'Countries should calm down and act as friends, and people should stop complaining about how bad everything is and make it good instead. You can complain about things being bad, but then you also have to do something to make it better.'*
*– César (13)*

*Figure 3–14. Participants of the pilot session making their collages*



Finally, analyzing the collages the participants made, six main topics were identified: innovation, heritage, nature/climate, safety/peace, enjoyment, food & water and health. These topics were talked about in both preferable scenarios (their presence) and less than ideal ones (their absence). Still, these could be considered the "pillars" a society's future is built on, according to the participants. In the later sessions at the school, it was evaluated whether this framework still fit the results of those activities.


*Figure 3–15. Recurring themes in children's collages*

All in all, this pilot test was very useful to confirm a few things. First, children's images of the future are indeed very determined by adults' preconceptions. Secondly, these images are highly abstract, and children find it hard to picture their own lives in these futures. Lastly, although they are worried about it, they also have hope that they can help create a better future — they just do not know exactly how yet.

Regarding the methodology used, the collage worked very well; the participants were immersed in the task at hand. They also provided much more detailed and rich answers when explaining what they made, compared to the initial open questions they had been asked. Holding group sessions was a good idea, but the social dynamics that come into play should also be considered. For instance, the younger sibling imitated the layout of the elder, although the content was different. For that reason, being aware of which children are more easily influenced by others' answers and having them present their work first is a good idea. Still, this method was succesful in gaining the insights needed, so collage-making was kept as the core activity for the subsequent session.

## Co-speculation sessions

Once deeper insight had been gained on children's perception of the future through the pilot sessions, a second set of sessions was organized. Their first goal was to verify whether the conclusions drawn from the pilot were generalizable. Additionally, once children's difficulty relating "The Future" to themselves had been identified, a way to help them do this was thought of and tested.

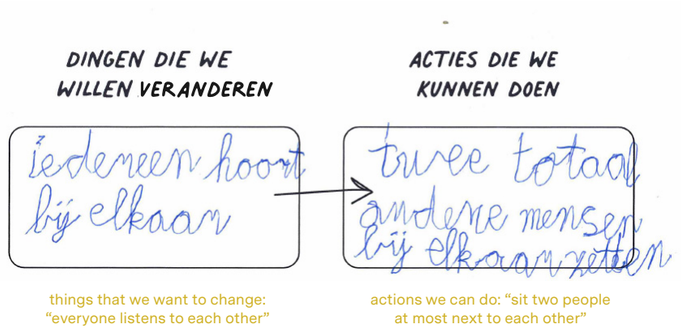
These sessions were carried out at a school in Rotterdam over the course of one school day, with three different classes participating (group 1: ages 11-12, group 2: ages 7-8, group 3: ages 9-10). In total, 30 children participated in the sessions, which lasted 1-1,5h. The sessions were facilitated in English and Dutch with the help of a teacher, who also acted as translator between the children and myself. Audio was recorded during the sessions, in order to extract quotes afterwards; extensive notes were taken and used as the primary analysis material later on.

During these sessions, children were given the same set of images as in the pilot session, and asked to make a collage of what they thought the future would be like (Appendix D). They were asked to work in groups of two or three students each, but were allowed to make a collage individually if they expressed their wish to. It was also requested that they would write next to each picture what did it relate to, regarding the future.

Up until this point, the sessions only had some very subtle differences with the pilot session. The wording of the assignment was modified carefully, avoiding to mention qualifiers such as "good" or "bad" or allude to the utopia/dystopia dychotomy when mentioning the future. Thanks to this, more nuanced futures (including a bit of everything) were thought up by the participants. This also allowed a more accurate understanding of their attitude towards the future to be formed.

Once the participants had finished their collages, a second activity was proposed to them. It consisted of a worksheet, asking them to identify in their collage three things they would like to happen and three things they would like to avoid in the future. Then, they were encouraged to think, for each of them, of one small action that would contribute to either create or bypass those situations (Fig. 3—17).

*Figure 3–16. Participants making a collage in a group*




things that we want to change: "everyone listens to each other"

actions we can do: "sit two people at most next to each other"

*Figure 3–17. Example of an answer to the 'action plan' exercise*



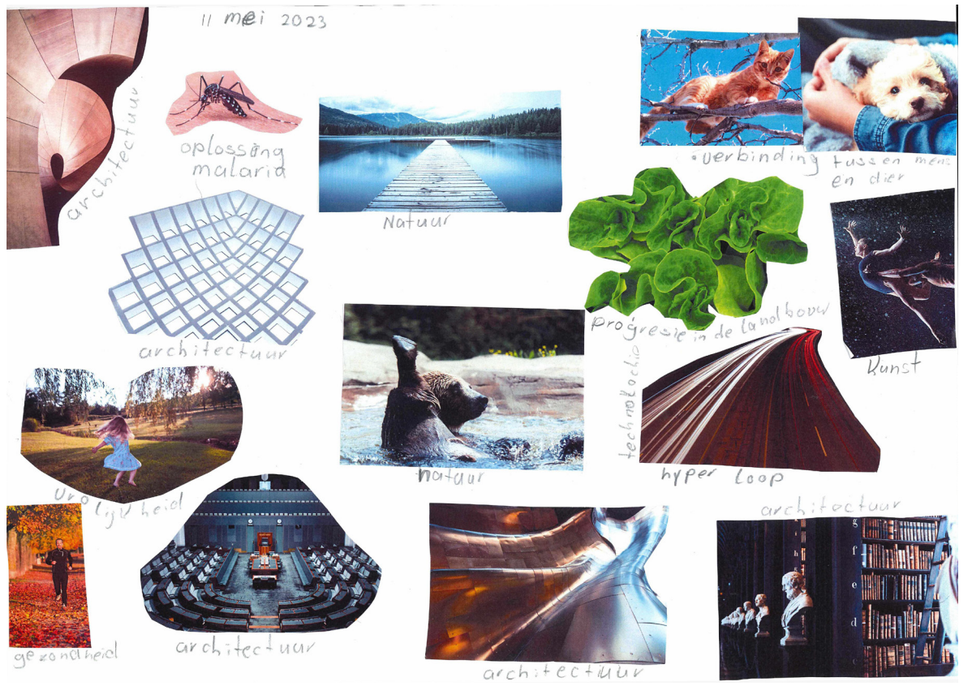



*Figure 3–18. The future according to Eline (11)*

*Figure 3–19. 'The future is becoming older', by Kika, Amanda and Mara (9)*


*Figure 3–20. 'Project Future', by Lara, Seb and Nicky (10)*


*Figure 3–21. The future according to Luca (7)*



Unlike making the collage, with which only some children struggled minimally, quite a few participants showed difficulties doing this exercise. This was especially so with the group of 7-8 year olds; although they managed to make their collages without issues, filling in the worksheet was described as "very difficult!". It was noticeable easier for the children aged 11-12 to do this exercise. Whether this stems from the level of development of their abstract thinking cannot be affirmed without further testing, but it is the working hypothesis. Still, if the Co-Learning Expo intends to make the future tangible for children of ages 6-14, it is important to keep in mind that the youngest of the group might need some extra help. One possible solution would be to add more in-between steps, to show the relations of cause and effect between the small actions and the big repercussions.

For two of the groups, because of time constraints, the sessions ended with the previous activity (filling in the action plan template). For the last class, however, it was possible for the participants to present and explain their collages to their fellow students as a final exercise. This step was very useful, as it encouraged the children to verbalize their reasoning and form a coherent narrative. The results showed both participants' awareness of the big challenges the future holds and their boundless curiosity and excitement for the unknown.

***D.R. – The exhibition should help make the future concrete and tangible, as well as provide challenges that are within the power of children to tackle.***

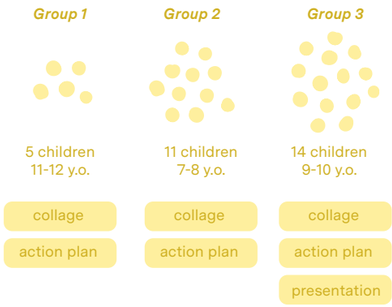



*Figure 3–22. Overview of participants and activities in each co-speculation session*

***'We named our project 'The future is becoming older'. So for example with this photo, yes. When a machine breaks down, for example to bake pots. Then you can still bake pots. They used to do that, and then they think of it now; 'oh that's pretty easy with this machine but it used to be really hard.' So we're going back to using things from the past to improve the environment.'***

***'More bigger street art. I think that's a bigger thing in the future, because then there will be more people, probably. Because there are more people, because the earth is getting tighter. Then we have more streets. And more cities. So more cities, that's why you have more street art.'***

***'And this picture [.] represents less racism because you see here all the time, lately, and you hear a lot of bad news lately about racism and I'm really sorry about that. I just think it will be more [in the future]. Because more and more people, people are becoming more and more spoiled and meaner and unkind. [.] And then this one. That stands for, 'we are here and The Hague is still there'. And that stands for we can solve the problems better than the government. Because the government is having a bit of a meeting about that, but we are here, and we can do something about it. And the government, that's just standing there having a little meeting.'***

***'New showers, because the showers are a bit boring now. So I do think that those will be a bit different in the future.'***

***'We hope that more people will visit mountains. More things to explore on the mountains as there haven't been many people who have been on mountains yet.'***

When it came to analyzing the results of the sessions, the notes taken during them were the main material used. During the sessions themselves, many themes that had already been present during the pilot session re-appeared, with a few extra nuances. Once again, the environment was the most mentioned topic, regarding issues like global warming, animal welfare, access to (play in) nature and stopping pollution. Safety was a dominant theme as well, both relating to the absence of violent conflicts and in the sense of social equality and everyone having their basic needs met. Innovation was a recurring topic as well, in the fields of architecture and technology mostly (including AI) — however, several participants questioned if technology is always good and mentioned going back to older techniques (heritage). Health (physical and mental) was mentioned multiple times, as well as enjoyment (having fun, being able to see beautiful things around you). An interesting new subject that had not come up before was achievement; several participants mentioned in the future we would become better, more capable and would all have enough money.

Overall, the themes participants of these sessions mentioned repeated those that came up during the pilot session, with a few small additions or clarifications. In any case, the most relevant insight gathered through this session was children's difficulty in connecting abstract futures to their implications for themselves, and the need for the design of the Co-Learning Expo to account for this.

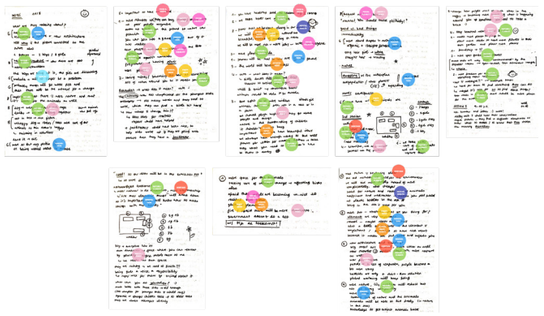


*Figure 3–23. Session notes thematic analysis*

## MAIN INSIGHTS

Children are aware of many more issues that we will be facing in the future than adults think, and generally have a go-get-it attitude towards them.

To connect abstract futures with present actions, children need multiple intermediate steps and guidance (what is known as scaffolding). This is especially necessary the younger the children are.

The topics that children consider relevant when describing the future are: innovation, heritage, nature, health, food & water, safety and enjoyment.



# Research artefact

During the pilot session with children, it was observed their idea of the future is greatly influenced by what adults tell them. Still, children have a superpower that adults sometimes neglect: curiosity. What questions do children have about the future — what do they want to know? A research artefact was developed, between the pilot session and the session at the school, in an attempt to find this out.

Initially, it was conceptualized as the 'Mailbox of the Future' (Fig. 3—24), in which children would be able to send their messages and questions to the future. However, this idea was not appropriate to the user group, since children of the user group have (generally) had little interaction with physical mail. Knowing this, the concept was reframed into the 'Future Google' (Fig. 3—25). It consisted in a box with a prompt — "What question(s) would you ask someone from the future? — and some small cards that could be filled in and introduced in the box.

The artefact was placed in the entrance of the museum on the day of FamilieFest, an event organized during the school holidays for children and their parents. However, the artefact was not very succesful in attracting children's attention, since it only received a few responses. These were playful responses, such as "Are there flying shoes?" and "Are there flying skateboards?"

The failure in grabbing children's attention might be due to a few factors. The placement of the intervention was not ideal, since it was far away from where the other activities were being carried out. That day, the museum had an abundance of more interesting stimuli for the children, such as workshops and games. The size of the artefact itself might have also been too small.  All in all, this exploration did not provide many new insights, but it did highlight some of the challenges of museum experience design for children.

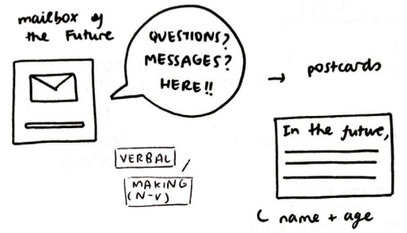
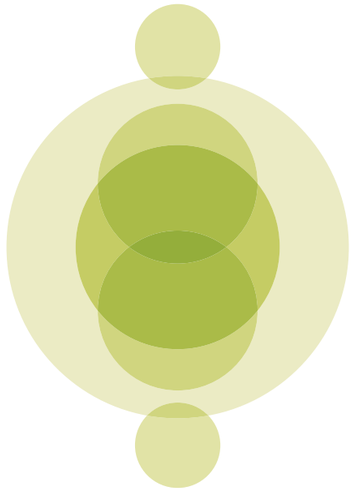



*Figure 3–24. Initial sketches of the research artefact concept*


*Figure 3–25. Research artefact in the FamilieFest day*


*Figure 3–26. Research artefact prototype*



# Chapter 4. Design Guidelines: Bridging the research - practice gap

As stated by Zielhuis et al. (2022), “it can be challenging to find suitable and actionable formats to capture and communicate knowledge from design research to a larger design practice audience”. Bridging the gap between design research and practice is a difficult endeavour. The challenge lies in transmitting the “tacit and experiential type of knowledge” (Zielhuis et al., 2022) researchers have gained to those practitioners that could apply it. Certain techniques have been identified as useful — annotated portfolios, concrete examples and mid-level of abstraction design guidelines.

What are design guidelines? In a general sense, guidelines are reference material for the designers developing a certain product/service/experience, in order to ensure the outcome of the design process will fit users’ and other stakeholders’ needs, as well as process/production requirements. From a human-centered design perspective, design guidelines are requirements and recommendations generated based on the results of user research. Generally, they are the translation of design principles into more concrete and actionable instructions. Design guidelines are characterized by a medium level of abstraction and openness, being the in-between step to design principles (very broad) and design rules (highly specific) (Interaction Design Foundation, n.d.).

This project stands as the research prior to the design of the Co-Learning Expo, which will be handled by an external design agency. Therefore, the insights gained were translated into design guidelines, which were later passed on to them. These guidelines included the two most common social contexts in which children visit Nieuwe Instituut: with their school, usually facilitated by a detour guide, or with their families. This chapter will present the overview of design requirements for the Co-Learning Expo, in the state they were at the end of the user research phase of this project. The process of converting these requirements into guidelines can be found in Chapter 5; the final set of guidelines is included in Chapter 6.

# Design requirements for the Co-Learning Expo: an overview

Resulting from the literature review and in-context user research carried out, a list of design requirements was formulated. Although they went through a series of iterations in terms of format, the content remains essentially the same. This section serves as an overview of the insights gathered during the research phase of this project. The design requirements for the Co-Learning Expo are as follows:

1. The exhibition should avoid falling into popular imagery of the future, and should encourage children to think beyond it as well.

    What children think of the future is highly influenced by what adults (parents and teachers) tell them, as well as what they see in the media. If the exhibition perpetuates these narratives, children are not going to come up with their own version of the story, which is what we want. The aim of the exhibition is for children to reflect for themselves and form their own opinion.

2. The exhibition should include several challenges or activities for children to do, each of them around a different topic relevant to them.

    Children are attracted by challenges, and making serious issues into a game is a simple way to encourage them to engage with these topics. These challenges should stimulate their creativity and discussion with their families or other children. During the research carried out, children were asked to imagine the future. Recurring topics that form the basis of the future for them are innovation, heritage, nature/climate, health, food/water, safety and enjoyment.

3. The exhibition should help make the future concrete and tangible, as well as provide challenges that are within the power of children to tackle.

    During the activities carried out with children, it became clear that thinking about abstract futures is not difficult to them. However, they do not see how these issues could affect them in the future, or how their current actions affect the future. There needs to be a way of connecting their daily life and the things they understand to the distant future, so it makes more sense to them. This also means if the exhibition has a sort of challenge to be solved, it should be something that children are able to solve themselves — then it can be connected to a bigger issue. Example: children are taught how to do a short breathing exercise, which helps tackle the issue of people being angry at each other, which eventually ties in to social instability.



4. The experience should be educationally empowering for children.

    Empowerment can mean very different things, but in this case we focus on educational empowerment: providing children with the tools they will need in the future. Futures Literacy is one of these abilities, but not the only one. Children should come out of the exhibition feeling proud of what they know, excited about the new things they have learned and better prepared for the future than when they entered.

5. Children should be able to express their ideas in the way(s) that comes most naturally to them.

    Instinctively, every child prefers to express their ideas and opinions in a certain way. Mainly, these ways fall into three categories: verbal/discursive (talking, writing), non-verbal/designerly (drawing, building) or embodied/enacted (roleplaying, acting, active dramatization). If this exhibition means to invite children to share their ideas, then there should be space for them to do this in the way they are most comfortable with. Each challenge or activity should be formulated with this in mind, so each child will find something they enjoy doing.

6. The design of the exhibition should be inviting and stimulate children to explore, without feeling constrained to a specific route.

    We want children to be the protagonists of this experience. This means giving them the freedom to follow their intuition; this should be done through the design and distribution of the space. If there is no hierarchy or order the stations should be visited in, children get to make their own choice. Literature also shows that children respond really well to being given a role to play, a responsibility. This could be one technique to use as well.

7. Less is more, but a balance should be struck between simplicity and shallowness. Different layers of meaning could be included to cater to different ages.

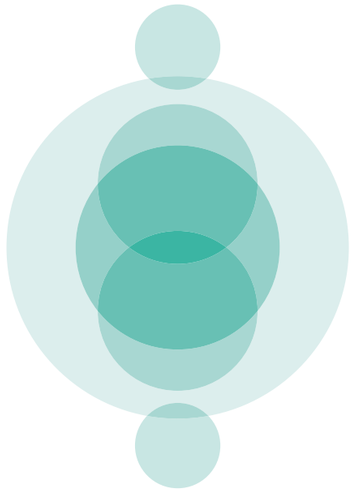
    For younger children, big quantities of new information can result overwhelming. Especially if there are multiple stations, too many stimuli can drain them. Because of this, the message each station wants to transmit should be clear and simple. However, older children appreciate being intelectually challenged; they do not want to be viewed as little kids, so if the challenges are too simple they will not be engaged. That is why there could be different levels of complexity. Example: the stations have some text that can be optionally read, some interesting related facts or data visualizations, etc.

8. The overall tone of the exhibition should be hopeful; however, appropiate weight should be given to children's concerns and fears about the future.

    Children are a lot more aware of the issues we are facing than we usually think. This, in some cases, results in fear and sadness related to the future. The aim of this exhibition is to empower children, showing them that there is something they can do to change the future. The message the exhibition gives should be nuanced, instead of purely positive, which could be insincere. Example: instead of saying "everything is going to be solved", say "we can work together to make this better".

Additionally, there was one principle that was considered to be a design opportunity, but which would later on inspire a new design requirement: Children could have a tangible takeaway from the experience, so they can show their parents or other family members. This opportunity initially emerged from interviews with parents, where they mentioned how their children enjoyed showing them what they knew or what they had learned during museum visits. Moreover, it could be a way to support children in the later phases of a transformative experience, aiding in the integration of their new perspective on the future and themselves into children's self-narrative. However, this requirement was initially overlooked — which does not take away from its importance.

As has been established, these are the design requirements for the Co-Learning Expo. This project initially aimed to provide design guidelines; this term has been rephrased into 'design guidance', since the final outcome does not follow the same format as design guidelines traditionally do. In the following chapter, the final version of this design guidance can be found.



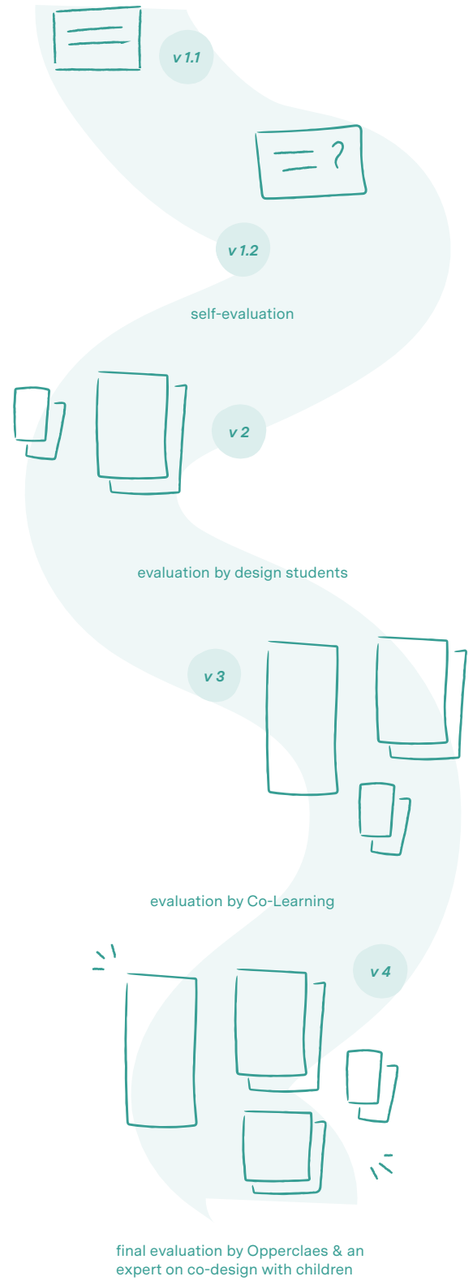
# Chapter 5. Design Guidance: Evaluation and iteration process

A crucial step of this project was to communicate the insights gained throughout the research process to the design agency that will develop the Co-Learning Expo. The success of this transfer would greatly increase the probability of the insights being applied. Knowing this, let us think of the design guidelines as a product, whose intended user is the design agency. This means, of course, that the usability of the guidelines needed to be a primary concern when they were being designed. In this case, the decision was made to take a research-through-design approach — creating the guidelines first, testing them and iterating on them. The design of these guidelines would fall into the category of information design, which is “the practice of presenting information in a way that makes it most accessible and easily understood by users” (SEGD, n.d.). Additionally, during the process, the Co-Learning department of Nieuwe Instituut was identified as another possible final user of this guidance. They could apply it in their work when designing the educational materials surrounding the Co-Learning Expo (workshops, activities, etc). This was taken into consideration, so the design guidance was tested with them as well.

To ascertain whether the design of the guidelines achieved its goal, it needed to be evaluated according to three factors: format, actionability and validity. Format relates to the presentation of the guidelines: is the procedure of use straightforward? Is the wording clear? Are the visuals a good complement to the text? Secondly, actionability refers to how useful the guidance is in the design process: is it inspiring for designers? Is the level of abstraction right? Finally, the validity of the guidance needed to be evaluated: is the research behind it contrasted? Is it explained in a trustworthy way? And most importantly, does this guidance truly lead designers in the right direction?

This evaluation and subsequent iteration was done in three steps. First, I myself tested the guidelines, using them as a tool for ideation. I reflected mainly on the format of the guidelines, as well as their actionability. This was the moment when the ‘design guidelines’ became ‘design guidance’. After a first iteration, a brainstorm was carried out with designers (Master students), using the guidance. Since they did not have the implicit knowledge that I had at that stage, this helped to assess the guidance’s understandability. The method of use was also tested. Again, the feedback from this evaluation was implemented. Finally, the improved guidance (or toolkit) was tested with the Co-Learning department of Nieuwe Instituut.

The following section will describe, in detail, the different iterations prior to the final version of the guidelines. The design decisions and the insights that informed them will be discussed, as well as the procedure followed for their evaluation. The subsequent chapter (Chapter 6) will present the final design guidelines, after having gone through the entire iteration process.



# Cycle 1 - Self-evaluation

During the research phase of this project, a list of design requirements was progressively compiled (Ch. 4). Being a designer myself, it was decided that for the first evaluation of the guidelines I would try to apply them, using them to come up with concepts for the Co-Learning Expo.

The starting point of this design-evaluation cycle was the list of design requirements — all in plain text, just one after the other (Chapter 4, Appendix B—1). It immediately became clear to me that this format was not appealing to me at all. This was problematic, especially considering how passionate I was about the research itself. A change that (despite being small) was very helpful was converting the design requirements into design challenges (Fig. 5—1). When faced with lists of rules, especially in a textual format, it is unlikely designers will be excited to engage with them. However, we are familiar with "How can we…?" questions, which invite us to explore and give an answer.

This somewhat subtle intervention was quite effective, so I set out to ideate concepts for installations within the Co-Learning Expo. Still, it soon became apparent that these guidelines contained too much information to be taken in at once. Not only was it overwhelming to consider all of the different factors; it was very difficult to come up with a concept that fit every criterion. This made it very hard to get into a creative flow. Eventually, what I ended up doing was choosing a topic, then picking two or three guidelines (challenges) at random and ideating based on them. This method was significantly easier and less constraining; still, it could be taken a step further — which takes us to the second iteration cycle.

*v 1.1*

> *D.R. – The exhibition should avoid falling into popular imagery of the future, and should encourage children to think beyond it as well.*

*v 1.2*

## How can we encourage children to create their own images of the future?

**We avoid the stereotypical concepts and visuals associated with the future as much as possible.**

What children think of the future is highly influenced by what adults (parents and teachers) tell them, as well as what they see in the media.

If the exhibition perpetuates these narratives, children are not going to come up with their own version of the story, which is what we want.

The aim of the exhibition is for children to reflect for themselves and form their own opinion.

*Figure 5–1. Example of evolution from a design requirement (V1.1) to a design challenge (V1.2)*



# Cycle 2 - Evaluation by design students

It is not uncommon, in design research projects, to find that the insights generated are finally translated into a card set or a toolkit. Giving insights a physical receptacle facilitates many micro-interactions that can nevertheless be very useful in a design process — such as pointing to a card, passing it on, shuffling and picking at random, comparing several elements, etc. Not only that, but this way of gamifying design requirements can make them more appealing while still allowing the researchers to establish certain rules of engagement. In this way, the manner in which the insights are used can be defined to a certain extent, whilst providing designers with a more dynamic and free-feeling experience.

During the first testing cycle of the guidelines, I observed myself having behaviours that could benefit from being legitimized by the guidelines' format. Mainly, having written each guideline in one piece of paper in order to be picked at random inspired me to create a card set. Since this project deals with the future, and designing could be seen as a form of anticipation, Tarot cards came to mind.

A Tarot is a deck of 78 cards, each of them with a specific symbolism and meaning. Traditionally, they were used for divination, in order to attempt to predict the future. Falling into the domain of esotericism, there are as many ways of using Tarot cards as there are people who use them. Although the validity of their use for prediction is widely questioned, Tarot cards are sometimes regarded as a tool for introspection and self knowledge. There are various types of readings, but usually a person will draw one or several cards from the deck while they are spread face-down. Often, each card picked provides answers to a question, or represents a time span (past, present or future). Every card on the Tarot deck has a detailed illustration and a characteristic meaning, which can be interpreted using the supporting booklet that goes with the deck. Once one picks a card, they try to uncover what it can represent, related to the events of one's life.

This reference to Tarot cards already exists in the SD community, through the work of Artefact Group (n.d.) and their Tarot Cards of Tech (Fig. 5—2). These cards serve as tools for reflection in creative processes, sparking debate about possible impacts of technologies. Although dealing with a different subject, the existence of this toolkit further supports cards sets as a useful aid for guiding SD endeavours.


*Figure 5–2. Tarot Cards of Tech, Artefact Group*

## Design

For this second iteration cycle, two card sets were developed, inspired loosely in Tarot cards and the interactions they facilitate. These interactions are namely picking blindly from the deck and reflecting on what the card represents in relation to the topic. The result was two deck of 8 cards each, corresponding to the 8 original design guidelines. The first deck consisted on cards with an ambiguous name and a visual, meant to resemble Tarot cards; the second deck had bigger cards, containing the corresponding information to each of the smaller ones.

The intended procedure of use of these cards was as follows: during ideation, each person would draw one of the smaller cards at random (Fig. 5—3). Then, they should look for the corresponding bigger card (which has the same name and accent color). In that card, there would be a series of prompts for reflection, which could be used both for inspiration to detail the concept or as a sort of checklist to evaluate it. Ideally, this process would be repeated until every guideline had been taken into consideration for the final design.

In this iteration, the bigger cards' content remained largely unchanged compared to the first cycle, continuing to pose challenges to designers. However, the format of that content changed slightly. Initially having only one question or challenge, followed by an explanation of the research behind it, the new cards contained a main question, 3-5 prompts for reflection, and finally a summarized description of the research that had informed the guideline. The smaller cards were meant mainly as inspiration and to facilitate the drawing of a card, so no information was included in them.

In the end, the guidelines could be categorized into three clusters: roles that children should be stimulated to take (the Visionaries, the Champions, the Explorer), core abstract aspects of the exhibition (Power, Expression and Balance) and practical aspects that should be taken into account (the Bridge, the Staircase). Figure 5—5 shows an overview of each card and its corresponding design requirement.

*Figure 5–3. Random card picking*

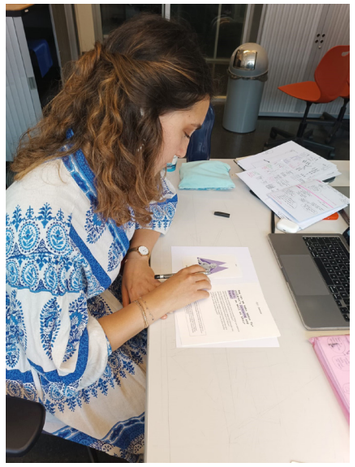


*Figure 5–4. Participant using the card set for ideation*

| *Card name* | *Summary of design requirement* |
|---|---|
| I - The Visionaries | Children should be stimulated to create their own images of the future |
| II - The Champions | Children should be challenged as a way to engage them in futuring |
| III - The Bridge | The exhibition should help children make a connection between abstract futures and the present |
| IV - Power | Children should be encouraged to develop and/or practice useful, soft/hard skills for their future |
| V - Expression | Children should be stimulated to express themselves in their preferred way |
| VI - The Explorer | Children should be invited to take the lead in the exhibition and explore freely |
| VII - The Staircase | The exhibition should include several layers of complexity for different ages / engagement levels |
| VIII - Balance | The tone of the exhibition should be nuanced, allowing children to express both hopes and fears |

*Figure 5–5. Overview of cards and their corresponding design requirements*




*Figure 5–6. Corresponding cards of each deck*

v2

### How can we encourage children to create their own images of the future?

What kind of images of the future are included in this exhibition?

Is there space for children to draw their own conclusions about the topics presented? Are these topics discussed in an open-ended enough manner?

Is this exhibition perpetuating either dystopian or utopian stereotypes?

What less conventional perspectives can be taken on this topic? How can we remain nuanced?

What kind of questions do we want to present children with?

What children think of the future is highly influenced by what adults (parents and teachers) tell them, as well as what they see in the media.

If the exhibition perpetuates these narratives, children are not going to come up with their own version of the story, which is our ultimate goal.

*Figure 5–7. Example of a card with a design challenge, prompts for reflection and a brief explanation (V2)*


*Figure 5–8. The Tarot-inspired cards, loosely classified in three categories*



## Evaluation

Once the card set(s) had been developed, an evaluation session with design students was organized. One of the main goals was to learn whether the new format was more inspiring than the previous ones, as well as easy to use. Additionally, through this session the content of the guidelines was tested by people external to the research team for the first time, which provided insights into whether the findings were communicated effectively.

The evaluation session was conducted with four design students, all of them currently finishing their Masters in design-related disciplines at TU Delft. It lasted one hour and was carried out in English; audio was recorded and later transcribed to extract significant quotes. A questionnaire was also provided, in order to have both quantitative and qualitative data.

Prior to the session, they were sent the 1.2 version of the guidelines (consisting of questions and explanations) (Appendix B—2) as sensitizing material. Then, the session was approached as a brainstorm. The Co-Learning Expo was briefly introduced, as well as some background information on the research. Afterwards, each participant chose one theme to ideate an installation on, from the ones identified during the workshops with children. The themes they picked were nature, health, water and enjoyment. They were asked to design an museum installation in order to help children reflect on the future of that topic. Afterwards, they were instructed to pick one card each and revisit their concepts, detailing them or making changes as they wished. Participants were asked to use different colors of pen were used for each ideation "round", in order to differentiate them later. When they had finished, the participants presented their concepts to the group. Finally, they filled in a questionnaire and had a group discussion about their experience using the guidelines.

*Figure 5–9. Participants ideating with the aid of the card set during the evaluation session*

Figure 5—10 summarizes the concepts that participants came up with, as well as the modifications that they made to it based on the design challenge they drew. Overall, they were able to reflect on their designs and make changes that allowed them to better answer the challenges they were given. This is a good indicator of the guidelines' actionability.

| *Participant* | *Theme* | *Initial concept* | *Design challenge* | *Iterated concept* |
|---|---|---|---|---|
| P1 | Nature | Experiencing the ecological crisis through all five senses (smelling a polluted city, seeing what healthy vs. damaged soil looks like, etc) in order to make sense of the reality that surrounds them | The Visionaries - How can we encourage children to create their own images of the future? | Children are given options that they can choose between — what do they want the future to look like? What do they think is most likely to happen? |
| P2 | Health | Social distancing in 2050 — children are allowed to place life-sized figurines of people around the room, and given materials to build connections between them safely | The Staircase — How can we ensure the intricacy of the exhibition is adequate to different ages? | The room has projections that provide children with further information and triggering questions, based on the scenario they are building |
| P3 | Water | Installation showing the (unequal) distribution of water between factories, cities, villages, etc, through differently sized pipes. Meant to make children aware of some people's lack of access to water | Balance — How can we make space for children's concerns and fears, as well as their hopes? | The installation becomes interactive, allowing children to manipulate the water distribution and allocate resources in the way they think is more fair |
| P4 | Enjoyment | Collaborative artwork making, where children can either draw, talk or dance and their input gets translated to visuals | Power — How can we design an empowering experience for children? | This experience helps children practice their soft skills, such as teamwork, communication and respect, "since one child making something ugly to be funny would mess it up for everyone else" |

*Figure 5–10. Overview of concepts generated by participants and their evolution*

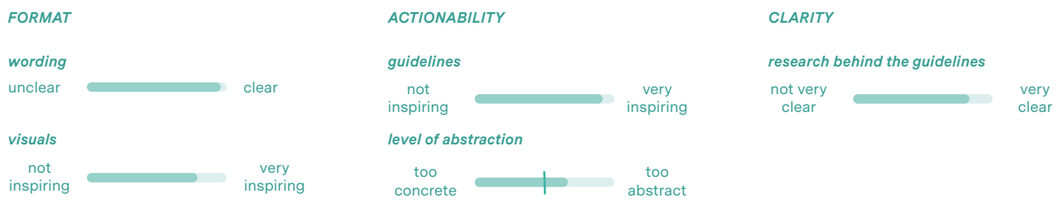



*Figure 5–11. Summary of evaluation questionnaire results from design students*

Overall, the participants gave positive feedback on the guidelines. A summary of the participants' assessment of the guidelines can be seen in Figure 5—11. In terms of the format, both the use of questions as well as having physical cards was described as more engaging and appealing than when the guidelines were presented as statements. Wording was overall clear, and the visuals were relatively inspiring (which was the desired effect).

The method of picking a card was also well received among the participants, who stated it was helpful to only deal with one guideline at a time, although the "fear of missing out" was mentioned as well. One participant also suggested the guidelines could be used in a group, where everyone is working on the same concept but taking a different card and defending that perspective. This served to further support the decision of the card decks, since the participants could already imagine several ways to use them. This was one of the main insights that was taken to the following iteration.

Choosing a card at random also resulted in a challenge for the participants, since they had to force fit the lens described in the card into their previous design. Force fitting is often used in creativity techniques; in this case, participants expressed picking a card without being able to see which pushed them to choose cards that might not have been their first choice. However, defensiveness was also an issue in this method, as participants experienced some resistance to changing their original design.

Looking at the actionability of the guidelines, participants generally rated them as very inspiring. They enabled participants to detail their concepts, coming up with new ideas and considering aspects they had not before. On the other hand, there was some confusion as to what the ultimate purpose of the guidelines was — as one participant expressed, they felt more like inspiration points than guidelines as such. Although this way of using the cards is more dynamic and less constraining for ideation, it might lead to the guidelines being received as closer to suggestions than rules. This was something to consider when working towards the final iteration of the guidelines. The guidelines were also referred to as a "checklist" multiple times, which suggests that they are perhaps slightly more suitable to be used for evaluation of concepts than for ideation.

*'Having questions [rather than statements] is nice because it presumes that you're going to answer, in one way or another.'*
*– P1*

*'I like the cards very much, because you sent the PDF beforehand and honestly I just looked through a bit like 'OK, yeah' [laughs]. This helps to make me pay more attention.'*
*– P3*

*'You're always wondering, 'Am I missing something?' But it's really helpful to only focus on one, and not all at once. It's easy to make a decision, and you can use it as a checklist, like 'Oh, I do have it' or 'No, I don't have it'.'*
*– P2*

*'Yes, and then you have one person responsible for each guideline. […] Everyone has a different goal, but not ten goals at once.'*
*– P1*

*'The picking is also nice because maybe sometimes you would pick the one that is most comfortable to you […] Then picking at random gives you a challenge, forcing yourself to work in this scenario.'*
*– P1*

*'At first I felt like I was trying to defend my idea with the cards, 'Am I doing this right now? I'm not sure' and then I started making my idea more concrete than it was.'*
*– P4*

*'I was confused whether it was for ideation or evaluation, does one concept need to follow all the criteria, or can it just fit one if it's already powerful. I was wondering how strict we should be on those things.'*
*– P2*



Participants were also asked about the clarity of the guidelines. Was the summary of the research included in each guideline enough for them to understand where it came from? According to the participants, it was. Nonetheless, several of them expressed they would have liked to learn more — which in a real-life context they could have done, by reading this same report. Additionally, they mentioned including some examples in each guideline could prove helpful for both understanding and inspiration. Drawbacks to this were identified by the participants themselves, both in essence (examples might be too influencing) and practical (lack of space on the cards).

Finally, there is the question of the validity of the guidelines — do they help lead designers in the right direction? Although this was a short and limited test, the resulting concepts did manage to integrate the principles described in each card. As it was mentioned before, this is a good indicator of the guidelines' actionability. In any case, the validity of the final guidelines was assessed by an expert and will be discussed in a later section of this report.

# Cycle 3 - evaluation by the Co-Learning department of Nieuwe Instituut

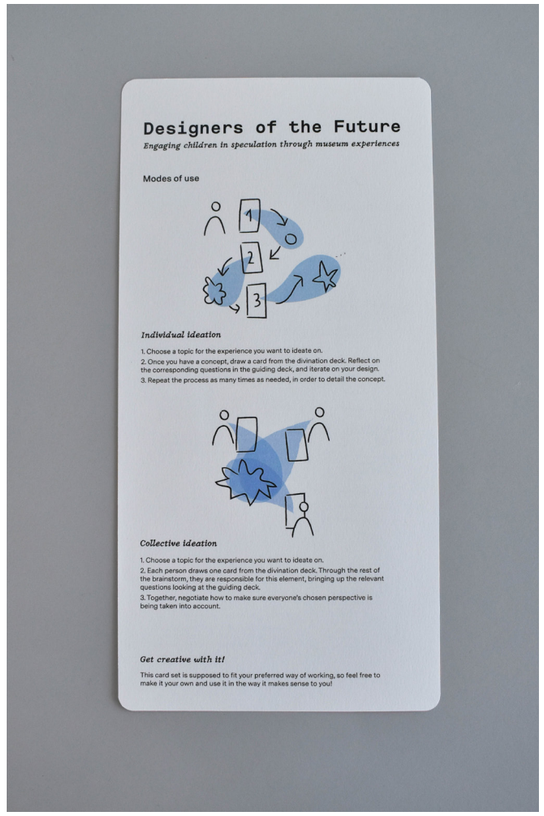
After evaluating the card sets with design students, several areas for improvement of the design guidance were identified. The third design and evaluation cycle aimed to integrate these new insights, finalizing with an evaluation session with the Co-Learning department of Nieuwe Instituut.

## Design

During the evaluation session with design students, it became evident that the toolkit was not yet complete. The main element which was missing was some sort of instruction sheet. This is due to the fact that it was not abundantly clear what each of the decks in the toolkit contained, or how they should be used. Based on this, the decks were given names (divination deck for the smaller cards, guiding deck for the bigger ones). Some of the ways in which they can be used, individually or within a team, were also proposed (Fig. 5—12).

On a practical note, the folder in which the toolkit would be contained was also designed. Additionally, some more detailed suggestions that the participants gave were also implemented, such as including a small label marking the bottom section of the guiding deck cards as 'Research insights' (Fig. 5—13). In this way, it is clearer to users what it is that they are reading.

Finally, a few opportunities that were pinpointed thanks to the insights from the evaluation session were set aside to discuss with the users (the Co-Learning department) directly. These included the possible inclusion of examples or concepts into the toolkit, as well as the options of personalization of the toolkit in order to increase its flexibility and the users' sense of ownership.




v 3

*Figure 5–12. Instruction sheet for the toolkit (V3)*

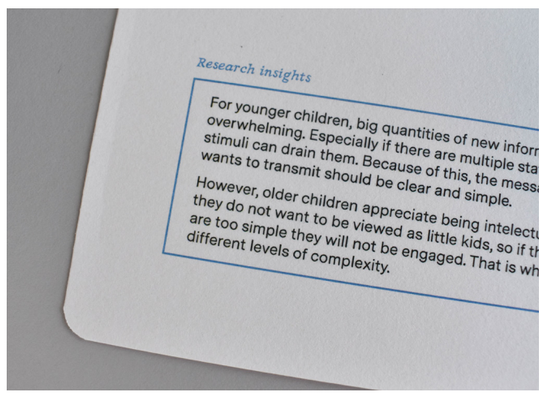



*Figure 5–13. Labelled research insights (V3)*



## Evaluation

This iteration was evaluated with the Co-Learning department of Nieuwe Instituut. They are the initiators of the Co-Learning Expo, as well as the organizers of the participatory experiences around the physical exhibition, such as workshops or other events. Initially, the Co-Learning department had not been identified as one of the final users of the design guidance provided by this project. However, it was eventually observed that many of the recommendations for exhibition design still applied to other types of experiences — meaning that they could also make use of this toolkit. An evaluation session with the Co-Learning department was organized in order to find out to what degree this toolkit could be useful in their work, and to get feedback on its format and actionability.

The evaluation session had three participants: the head of the Co-Learning department, the Education program manager and a research fellow of Nieuwe Instituut. It lasted forty minutes and was carried out in English; audio was recorded and notes were taken during the session. A questionnaire was also provided, in order to have both quantitative and qualitative data.

The session consisted in a short presentation of this graduation project, focusing on the underlying goal (to provide guidance on how to create empowering museum experiences about futures for children). Afterwards, the participants were invited to brainstorm together on a concept for a workshop that would accompany the Co-Learning Expo. Finally, an open discussion was held, in which the participants reflected on their experience using the toolkit.

During the ideation part of the evaluation session, the differences between the Co-Learning department and the group of design students the toolkit had been tested with previously started to appear. My initial intention was to recreate the real context of use as much as possible — which meant there should be little to no facilitation on my part. However, this made it difficult to kick-start the session, since (as one participant expressed) in the department they are used to carefully prepared and structured brainstorms. Additionally, choosing  a topic to brainstorm on was challenging, since the topics mentioned by children were somewhat 'hidden' in the toolkit (included in The Champions card). This eventually led to the development of the thematic deck (Fig. 5—14), which clearly presents the themes the exhibition could include, accompanied with quotes from the kids themselves.

v 4


**Safety**

***social (in)stability, violence vs. peace, community care, having your own space***

"That stands for less racism because you see it here all the time, and you hear very bad news about racism and I think that's very bad. But I think it will get worse, because people are becoming more spoiled and mean and unkind."

Lara, 10

"We need peace, because now some countries are angry at each other. I think countries need to calm down and become friends, and people should stop complaining about how bad everything is. You can complain about how bad everything is, but you need to do something, do it better."

César, 13

*Figure 5–14. Example of a thematic deck card*

In this session, the participants finally chose to brainstorm on the theme of ‘resilience’. What could a workshop meant to help children practice or become aware of their own resilience look like?

For this brainstorm, each participant was asked to pick one card, becoming then responsible for bringing up the questions related to it. The cards they drew were ‘The Champions’, ‘The Explorer’ and ‘Balance’. The participants reflected and discussed together on what the underlying qualities of this workshop should be. How could they leave space for children to guide the development of the workshop, even if it would be more challenging for them to plan? What kind of challenges could children be presented with that would be appropiate for them and allow them to have success experiences within the workshop? And how could they make sure to leave space for children to share their worries and know it is okay to not feel resilient all the time?

The participants were able to apply the prompts on the cards to the issue at hand, which enabled them to “have these important conversations from the beginning”. This was positively remarked by the participants, and further supported the idea that this toolkit can be applied beyond exhibition design. Participants also expressed that having one card each served to encourage everyone to speak up. Some issues regarding the format of the toolkit were brought up: mainly, one participant indicated being confused by the wording of the design challenges — were they requirements meant to be met, or prompts for finding diverging ideas? The answer to this question is both; it is a reminder that the open-endedness that makes the toolkit flexible can also lead to uncertainty in users. Despite this drawback, the adaptability of the toolkit to different types of users is prioritary. In addition to this, participants were presented the idea of the toolkit including some blank cards, in order for users to add their own insights and learnings to it. The participants’ reaction to this idea was enthusiastic; this aspect was taken into account in the final deliverable.

Regarding the mode of use of the toolkit itself, participants had slightly differing opinions. One participant commented he would have preferred to evaluate an already existing concept with the toolkit, since he felt it was difficult to keep in mind all three cards when coming up with ideas. Another participant suggested the brainstorm might have benefitted from the cards being drawn in timed ‘rounds’, in order to avoid this. In contrast, one of the participants highlighted the importance to set the base for the workshop while already considering the requirements, since they affect crucial aspects of the result (such as giving more agency to the children, for example). She was positive about the use of the toolkit in early concepting stages, and suggested a more structured framework to guide the initial conversations could be helfpul. A final concern that was brought up was a participant feeling constrained by the card he had drawn, regarding the type of ideas he felt able to add. He further commented on how different people might have their own preferences on how to participate in ideation, which the toolkit does not necessarily take into account in its current form.

*Figure 5–15. The Co-Learning department testing the toolkit by ideating with it*

*‘In a brainstorm I usually just like to spitfire ideas, even silly ones. This [the card] made me feel like ‘oh, am I saying something dumb? Does what I’m saying fit my card?’*



Overall, out of this brainstorm one final idea emerged. Participants linked resilience to the COVID-19 pandemic, remarking how children have lived through it. They devised an obstacle race where children would be the white blood cells, fighting a threat; children would be able to craft their own suits or tools to feel powerful against this challenge. Overall, this idea was succesful in integrating the elements of the different cards that were drawn: having an appropiate challenge, being able to freely explore and deciding for themselves what resilience looks like.

After the brainstorm, participants were asked to fill in an evaluation questionnaire. The results (Fig. 5—16) were majorly positive, with high scores for the format and actionability of the toolkit. On the whole, this evaluation session provided valuable insights into the usability of the toolkit, which were eventually translated into recommendations for further improvement.


*Figure 5–16. Summary of evaluation questionnaire results from the Co-Learning department*

# Chapter 6. Designers of the Future: a toolkit for the design of transformative museum experiences for children regarding futures

This graduation project set out to provide design guidance on how to engage children in speculating about futures in an empowering manner, creating a transformative museum experience for them. This guidance serves as a starting point for the development of the Co-Learning Expo of Nieuwe Instituut. An overview of what the design requirements for it are can be found in Chapter 4 of this report; Chapter 5 describes the process by which the outcome of this project reached its final shape. In this chapter, the resulting toolkit will be presented in its entirety. An overview of the elements it contains can be found in Figure 6-1.

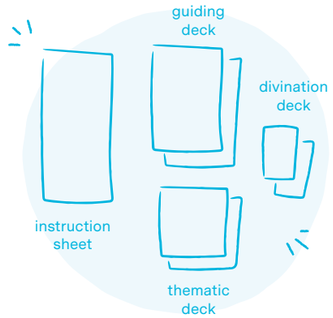



*Figure 6–1. Components of the Designers of the Future toolkit*


instruction sheet

thematic deck

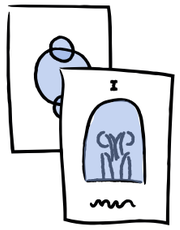
guiding deck

divination deck

# Designers of the Future

*Engaging children in speculation through museum experiences*

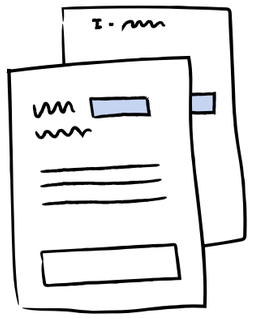
## This toolkit contains



### *Divination deck*

The divination deck is used to pick a card at random. Inspired by tarot cards, they should be chosen based on intuition when they are lying facedown.

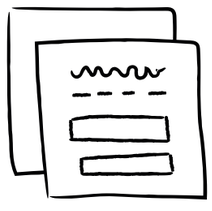
Every card in the divination deck corresponds to a card in the guiding deck, which complements it.



### *Guiding deck*

The guiding deck contains the main elements that should be taken into account to design experiences that invite children to imagine the future.

Each card contains a design challenge, several reflection prompts and a short explanation of the research insights leading to this card.



### *Thematic deck*

The thematic deck contains suggestions of topics that children think of in relation to futures. These topics can be used for brainstorming different stations for an exhibition or workshops, for example.

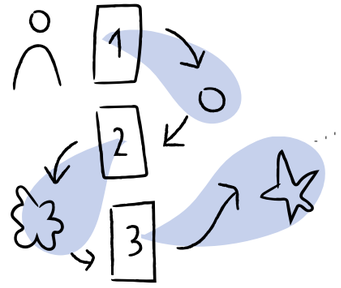
Each card contains a few keywords and some related quotes from children during the research process (interviews or creative sessions).



# Designers of the Future

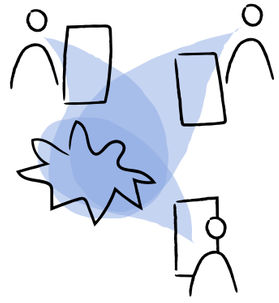
*Engaging children in speculation through museum experiences*

## Modes of use




### *Individual ideation*

1. Choose a topic for the experience you want to ideate on.
2. Once you have a concept, draw a card from the divination deck. Reflect on the corresponding questions in the guiding deck, and iterate on your design.
3. Repeat the process as many times as needed, in order to detail the concept.



### *Collective ideation*

1. Choose a topic for the experience you want to ideate on.
2. Each person draws one card from the divination deck. Through the rest of the brainstorm, they are responsible for this element, bringing up the relevant questions looking at the guiding deck.
3. Together, negotiate how to make sure everyone's chosen perspective is being taken into account.

### *Get creative with it!*

This card set is supposed to fit your preferred way of working, so feel free to make it your own and use it in the way it makes sense to you!

*I*

*The Visionaries*

*D.R. – The exhibition should avoid falling into popular imagery of the future, and should encourage children to think beyond it as well.*



*I – The Visionaries*

## How can we encourage children to create their own images of the future?

What kind of images of the future are included in this exhibition?

Is there space for children to draw their own conclusions about the topics presented? Are these topics discussed in an open-ended enough manner?

Is this exhibition perpetuating either dystopian or utopian stereotypes?

What less conventional perspectives can be taken on this topic? How can we remain nuanced?

What kind of questions do we want to present children with?

*Research insights*

What children think of the future is highly influenced by what adults (parents and teachers) tell them, as well as what they see in the media (movies, shows, social media, TV).

If the exhibition perpetuates these narratives, children are not going to come up with their own version of the story, which is our ultimate goal. Therefore we need to invite them to think beyond the typical.

II

The Champions





## How can we stimulate children to engage in futuring?

Are children being challenged by this exhibition? Is the topic of the challenge relevant for children?

How are children invited into this challenge? What can they gain from solving it?

Is the scope of the challenge appropiate for children's comprehension and skillset?

Are there opportunities for them to engage with their families or other children to solve this together?

*Research insights*

Children are attracted by challenges, and making serious issues into a game is a simple way to encourage them to engage with more difficult topics.

During the research carried out, children were asked to imagine the future. Recurring topics that form the basis of the future for them are innovation, heritage, nature/climate, health, food/water, safety and enjoyment.

*III*

*The Bridge*



*III – The Bridge*

## How can we help make the future more concrete and tangible for children?

What are some actions or issues associated with this topic? Which are simple? Which are complex? How can we create a bridge between them?

Are the connections between the present and the distant future made clearer by this experience?

Are children being guided in gradually moving towards abstraction?

*Research insights*

During the activities carried out with children, it became clear that thinking about abstract futures is not difficult to them. However, they do not see how these issues could affect them in the future, or how their current actions affect the future.

There needs to be a way of connecting their daily life and the things they understand to the distant future, so it makes more sense to them.

*IV*

*Power*



*IV – Power*

## How can we design an empowering experience for children?

What skill related to this topic can be relevant for children to have in the future?

Are children truly being empowered through this experience? = Are children given the opportunity to develop or practice skills that are useful for their future? (soft / hard skills)

Are they being made aware of this fact? Is there any element that can be added to the experience to reinforce children's pride in their abilities?

*Research insights*

Empowerment can mean very different things, but in this case we focus on educational empowerment: providing children with the tools they will need in the future.  Futures Literacy (learning to imagine different futures) is one of these abilities, but not the only one.

Children should come out of the exhibition feeling proud of what they know, excited about the new things they have learned and better prepared for the future than when they entered.

V

*Expression*



*V – Expression*

## How can we accomodate for children’s preferences when expressing their ideas?

What do we want to get children’s input and ideas on, regarding this topic?

Are children able to express their ideas in verbal, non-verbal and embodied ways?

Are children’s ideas being given appropiate weight, shared or archived in any way?

*Research insights*

Instinctively, every child prefers to express their ideas an opinions in a certain way. Mainly, these ways fall into three categories: verbal/discursive (talking, writing), non-verbal/designerly (drawing, building) or embodied/enacted (roleplaying, acting).

If this exhibition means to invite children to share their ideas, then there should be space for them to do this in the way they are most comfortable with.

*VI*

*The Explorer*



*VI – The Explorer*

## How can we stimulate children to take the lead and explore freely in this experience?

How are children being stimulated to explore?

How can discovery and wonder be integrated into the experience? If they wish to, can children move freely through the exhibition?

Are children being given the agency to lead the experience (for their families)? If so, what is the desired role for their parents to take?

*Research insights*

We want children to be the protagonists of this experience. This means giving them the freedom to follow their intuition; this should be done through the design and distribution of the space.

Literature also shows that children respond really well to being given a role to play, a responsibility. This could be one technique to use as well.

*VII*

*The Staircase*



*VII – The Staircase*

## How can we ensure the intricacy of the exhibition is adequate to different ages?

What layers of complexity can be added or stripped back in this experience?

How do children know they can “go up the staircase” as much as they want? Can children decide how much they want to engage with the expo, based on their interests?

Is there an opportunity for children to build their knowledge further, if they so wish? (during / after the exhibition itself)

*Research insights*

For younger children, big quantities of new information can result overwhelming. Especially if there are multiple stations, too many stimuli can drain them. Because of this, the message each station wants to transmit should be clear and simple.

However, older children appreciate being intelectually challenged; they do not want to be viewed as little kids, so if the challenges are too simple they will not be engaged. That is why there could be different levels of complexity.

*VIII*

*Balance*



*VIII – Balance*

## How can we make space for children's concerns and fears, as well as their hopes?

How can the exhibition show nuance? What are positive and negative futures related to this topic?

Is the narrative of the exhibition balanced between the positive and negative descriptions of the future?

Is there space for children to share their worries and concerns, as well as their hopes? How is this facilitated? Who are they sharing with?

*Research insights*

Children are a lot more aware of the issues we are facing than we usually think. This, in some cases, results in fear and sadness related to the future.

The aim of this exhibition is to empower children, showing them that there is something they can do to change the future. Still. the message the exhibition gives should be nuanced, instead of purely positive, which could be insincere.

# Innovation

*science, research, progress, technology, space, architecture, AI*

"We think we will go to other planets because there is too many people, and there's already people in space. So we will go there like in Star Wars."

Sietse & Eric, 11

"But they will get lazier though. Because things will get easier. People make more handy things. Because people used to mean to be able to hunt and cook if they want something and stuff. But now they can just go to the store and buy something and put in the microwave."

Marco, 13



# Heritage

*conservation, craftsmanship, nostalgia*

"And we'll appreciate the past more. […] Because people like the past. People get nostalgic from the past. So we will always… and people don't really want to let go of old things. So maybe there are people who still want to have normal cars or have old things. But eventually, everything's gonna be put in a museum here like this."

Marco, 13

"There's a risk that electronic things break down, so it's important that people still know how to do things with their hands."

Eline, Sarah & Anne, 11

# Enjoyment

*beauty, leisure, novelty, togetherness*

> “Also joy in life, happiness, meditation, that you are also well in your skin kind of.”

Kika, Amanda & Mara, 9

> “I think we will make the things around us beautiful, instead of making a mess. Because we should all have beautiful views to be happy.”

Kim, 8

> “There should also be more happiness for the less fortunate”.

Paula, 8



# Safety

*social (in)stability, violence vs. peace, community care, having your own space*

> “That stands for less racism because you see it here all the time, and you hear very bad news about racism and I think that’s very bad. But I think it will get worse, because people are becoming more spoiled and mean and unkind.”

Lara, 10

> “We need peace, because now some countries are angry at each other. I think countries need to calm down and become friends, and people should stop complaining about how bad everything is. You can complain about how bad everything is, but you need to do something, do it better.”

César, 13

# Food & Water

*access, shortages, equal distribution, alternative diets*

> “Everyone should have access to healthy food to grow strong”.

Kevin, Leo & Jayme, 9

> “Speaking of the bad side now, it happens a lot that there is not enough food to distribute to everyone. But I hope that will change”.

César, 13



# Health

*illnesses, pandemics, mental health, wellbeing*

> “We need the power that we become strong in our minds. Then we can take a break and be less angry with each other”.

Luca, 7

> “There will probably be a virus... because every 100 years there’s a virus”.

César, 13

# Nature

*access to nature, environmental respect, global warming, animal welfare, natural catastrophes*

"And I also think the weather's going to change. Global warming and stuff. So maybe it will become hotter. Some people think the world's going to die. I don't think so. I think that the world's gonna be prettier. I think people are going to care more about the environment, because people already care about the environment. But I think more people will care about the environment, because then they will become parents."

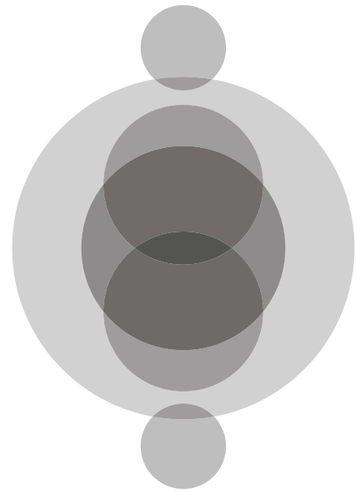
Marco, 13

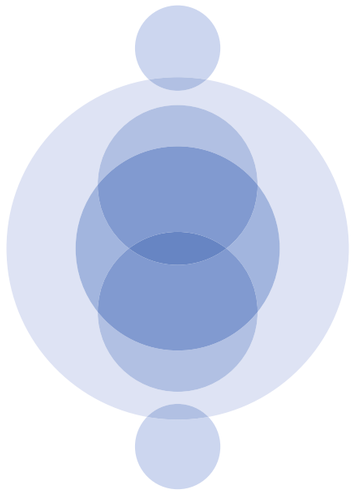
"Of the cotton flowers for making clothes… We will only take the ones we need, so they don't need to throw any away."

Savanne, 8

"We will take better care of our animals, and they will be free and not in a zoo or in a farm".

Diego & Hannah, 10





# Chapter 7. Evaluation of the toolkit with designers and an expert on co-design with children

After several iteration cycles of the Designers of the Future toolkit, as described in Chapter 5, the final evaluation sessions for this project were carried out. The Co-Learning department of Nieuwe Instituut participated in the development of the toolkit (Chapter 5). Afterwards the other final users of the toolkit, design agency Opperclaes, were presented the final outcome and provided their feedback. An additional evaluation session was conducted with Mathieu Gielen, expert on co-designing with children and designing for children's play. His input brought insight into the validity of the toolkit — in other words, how useful is this tool in guiding the design of empowering museum experiences for children about futures?

In this chapter, the approach taken for each evaluation session will be discussed, as well as the main insights gained during them. Further recommendations and conclusions will be given in Chapter 8.

*Now we are in a design process [...] and it would have been very handy if the client had cards like these, so they could tell us exactly what was missing in the whole thing. So this is kind of a briefing. [...] So you already think about the different layers inside of the problem you're trying to get fixed.*

## Evaluation with design agency Opperclaes

Since the Expo is scheduled to open its doors to the public in October 2024, its development is still in its very early stages. As such, this graduation project meant to provide a better defined design space for Opperclaes to work within. In order to present the insights of this graduation project to the designers, as well as get their feedback on the developed toolkit, a meeting was arranged. During this session, they were walked through the final design guidance, and briefly introduced to the research activities carried out during the project. The head of the Co-Learning department of Nieuwe Instituut was also present, which made it possible for a conversation about the different challenges the Expo should tackle to be had.

Opperclaes as an agency have extensive experience with participation, often involving end users in their design process. However, they had rarely worked with children between the ages of 8 to 12, and were very curious to learn what their attitude towards the future was like. Overall, they expressed their goal to make the Co-Learning Expo a space for children's fresh perspective on the issues we are facing as a society to be heard. When the co-speculation activities with children were recounted to them, they were very intrigued by the variety in children's outlooks on the future; the negotiation process that happened when children made collages in groups was singled out as a design opportunity for the exhibition to enhance. In addition to this, they were glad to hear that, although children nowadays are said to be becoming more individualized, this did not become apparent from the research. Collaboration between children was remarked as a very interesting direction to explore.

The thematic deck was presented to them first, providing an overview of the topics children mention when talking about futures. Then, the participants dove into the guiding deck, learning more about the design challenges the Co-Learning Expo should address. One of the designers expressed how this toolkit would be very useful in their process, since it acts as a more concrete starting point for them.

While being walked through the guiding deck, the designers started reflecting on the design challenges they were being posed and relating them to their own experience. For instance, regarding Expression, they discussed how participation in museums is very often drawing-based. They agreed that it is good to keep in mind that there is no one-size-fits-all way of inviting children to participate, and started thinking about how new technologies could play a role in the Expo, allowing for children to provide other types of input (such as voice, for example). In relation to Balance, they reflected on how adults tend to immediately try to fix children's problems, instead of truly listening.

During the discussion, some very interesting questions came up, which could not be answered with the research done thus far. One of those was how cultural and socioeconomic background influenced children's perspective — was there a correlation between children's context and their attitude towards futures? These lenses were not taken into account during this project, but would be relevant to further research. The question of how to foster collaboration (both between children and intergenerationally) within the Expo was also a recurring theme, which fell outside the scope of this project. Recommendations for future work will be discussed in Chapter 8.

Overall, Opperclaes reacted enthusiastically to the toolkit. They expressed how, being at the start of the project, this guidance gave them a headstart, as well as more structure in order to begin the project. "This way it is also hard to forget a part of the exhibition", one of the designers stated. They communicated their excitement to try out the toolkit, remarking how the Tarot-inspired names made it more abstract and inspiring.

When asked to select a few design challenges that they considered essential to tackle within the Co-Learning Expo, they chose The Bridge, Balance, Power and the Visionaries (Fig. 7—1). As they explained it, they felt the most important elements of the Expo were letting children think of futures for themselves, without being given answers already; allowing them to experience what those futures could be like in a tangible and solvable way. In order to do this, they identified the development of skills as a path towards empowerment.

To conclude, the designers jokingly remarked how "this will be easy, huh?!" — then expressed how they felt this toolkit would greatly support them in tackling the complexity of the Co-Learning Expo. On the whole, this evaluation session provided insights on the toolkit's strengths, as well as its limitations. These will be expanded on in Chapter 8.

*Well, we knew it was kind of complex, the minds of children. We as adults, we've really lost the free thinking that children have, and I think this is the most challenging part of making or designing an an exhibition, to feel what it is for kids to think freely. And I think the guiding deck will really support us in that.*

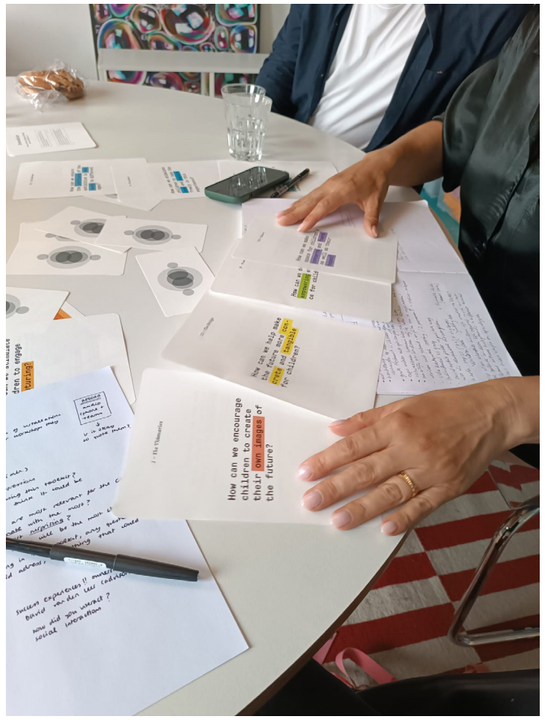



*Figure 7–1. The main challenges of the Co-Learning Expo, according to Opperclaes*



# Evaluation with an expert on co-design with children

The Designers of the Future toolkit aims to guide designers in creating transformative, empowering museum experiences for children ages 8-12, emphasizing the role they themselves can play in influencing what the future looks like. Whether this goal was met was assessed according to three factors: format, actionability and content validity. The first two were evaluated by the final users of the toolkit (the Co-Learning department and Opperclaes). However, to evaluate the third factor (content validity) a different perspective was needed. The format of the toolkit might be appealing and clear, and its principles easy to understand and apply — but are designers truly being guided in the right direction by it? Would an experience designed according to these principles definitely be empowering for children? In order to find this out, an expert opinion was sought out.

An evaluation session was held with Mathieu Gielen, assistant professor of Design for Children's Play at the Faculty of Industrial Design Engineering of TU Delft. His fields of expertise include design of toys, games and other playful objects; his main research interest is developing techniques to better understand children's experience of the world, as well as to co-design with them. An informal conversation was had, during which the project was briefly presented to him. Then, the toolkit was shown as well, focusing on the guiding deck.

The researcher was asked to share his first impressions of the toolkit. While reading through the design challenges, he reacted positively to their level of specificity, stating that the toolkit struck a nice balance between being concrete as well as open-ended. Proposing design challenges instead of requirements was also remarked as a good idea, "since these are not simple themes where you can say "do this and you will be fine"". The researcher moved on to state that this toolkit would prove very helpful for specialists in designing for children. However, he expressed some concerns that less experienced designers might be in need of more specific examples of how each challenge could be approached. Furthermore, he recommended including more raw data generated by the children themselves into the toolkit, in order to lend it more credibility.

Diving into the specific cards, he was asked to select the three challenges that were most essential for the Co-Learning Expo to address (Fig. 7—2). Those turned out to be The Champions (How can we stimulate children to engage in futuring?), Power (How can we design an empowering experience for children?) and Balance (How can we make space for children's concerns and fears, as well as their hopes?). Building up on this, he created a second layer or category, which he labelled "child-orientedness": The Visionaries (How can we encourage children to create their own images of the future?) and the The Explorer (How can we stimulate children to take the lead and explore freely in this experience?). Finally, a third category of "pragmatics" was defined, consisting of The Staircase (How can we ensure the intricacy of the exhibition is adequate to different ages?), The Bridge (How can we make the future concrete and tangible for children?) and Expression (How can we accommodate for children's preferences when expressing their ideas?). He also remarked how these more "practical" challenges also felt less specific to the Co-Learning Expo, since most experiences designed for children would necessarily have to tackle them.

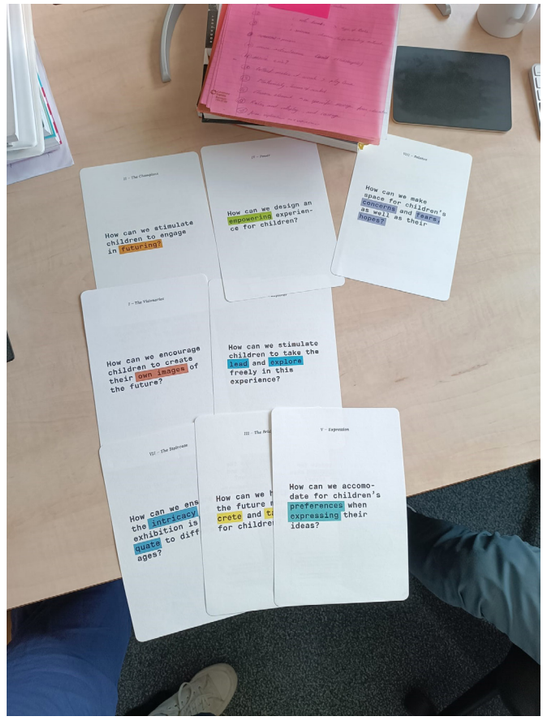



*Figure 7–2. The main challenges of the Co-Learning Expo, according to Mathieu Gielen*

Overall, the researcher found the toolkit would be quite helpful for designers, especially if those designers had experience working with children. He mentioned how it could be a great tool to keep the goals of the exhibition present during the design process. Additionally, he pointed out how this toolkit already contained a set of values, such as child-centeredness, which designers could be faced with and react to. “When the design agency chooses that they want a different way, they can at least react to what you’re proposing, rather than have a blank sheet”, he explained.

Some of the concepts that were generated during prior evaluation sessions with design students were presented to the expert as well. In reaction to them, he identified complexity as the main challenge for designers to deal with when using the toolkit; every concept got more detailed and concrete after each iteration, but its intricacy also grew. How to distill the essence of each design without making it overly complicated — that is the question.

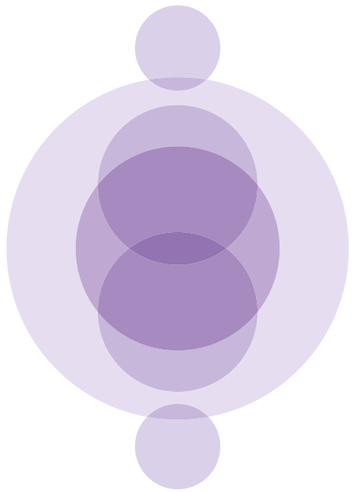
Regarding perceived gaps in the toolkit, the researcher brought up the need for children to take something away from the exhibition. “I think a museum visit is often one time, right? So you touch upon something, you spark something but creating habits, or creating really, really skillful behavior… To achieve this, I think there needs to be something of a follow up”, he expressed. Based on my own research, I can hypothesize that this new challenge would further complete the transformative experience for children, supporting them in the later phases. This opportunity had already been identified in earlier phases of the project, but was set aside as not essential; the expert’s opinion further proves this insight is important and should be included.

When asked whether he missed more guidance regarding the involvement of families or other adults, his opinion was blunt: not really. He mentioned how museums nowadays tend to focus not only on children, but also on parents and museum educators and the interactions between all three. From his perspective, adults can often direct children’s museum experiences a bit too much, feeling unsatisfied when children are not getting ‘the full message’. He advocated instead for letting children experience things for themselves, and for parents to avoid their parenting role. In any case, he recommended explicitly making a statement on families’ involvement within the toolkit itself.

To conclude, the toolkit’s validity was evaluated by an expert on designing for children, with predominantly positive impressions. Additionally, some recommendations on how to make it more complete and increase its credibility were given. These opportunities for further improvement will be elaborated on in the following chapter.

*‘You would always hope that the museum’s exhibition for children is done by specialists with experience in designing for children. So they will be greatly helped by this. Those who do not have experience will at least see some of the pitfalls, some things to work on. And yeah, it will be more work to acquire those skills, to acquire that knowledge, for them. Asking the right questions doesn’t mean that the answer becomes simple.’*

*‘Makes me happy. I think having to take parents or educators into account often distracts from a purely experience-centered approach; even if you don’t put information in the exhibition that’s where parents will start to fill the void, so I’m happy that I don’t see parents here. But this is I think a bit of a radical point of view.’*



# Chapter 8. Conclusions

Nowadays, children are growing up in a highly unstable world. In our popular, shared narrative, ‘the future’ seems to have become a synonym for socioeconomic crisis and environmental disaster. In the hugely globalized and intercommunicated reality we live in, this is a story that children can hardly stay oblivious to. At the same time, children’s creativity, enthusiasm and empathy seems to indicate that other futures are possible — especially if the younger generations are the ones creating them.

Knowing that, this graduation project started from a very broad question: how can we help children realize the power they have over what the future will be like, through a museum experience? In other words, how can we invite children to speculate about futures in a way that is empowering for them? These questions were posed by Nieuwe Instituut, the museum for architecture, design and digital culture of Rotterdam; they represent the ultimate goal of the Co-Learning Expo, which is currently in its early stages of development. This project aimed to provide an initial framework for the design of empowering, transformative museum experiences for children regarding futures.

In order to do this, literature on futures, children’s development, children’s empowerment and participation in museums was reviewed, as well as case studies of cultural institutions who have co-designed exhibitions or other experiences with children. This allowed for a better understanding of the context that the Co-Learning Expo is seeking to fit into. To gain insight on how participation and futuring are approached in the field of design, several methodologies were looked into, such as Participatory Design, Speculative Design and Context Mapping.

To truly grasp what children’s perceptions and attitudes towards the future are, participatory, generative activities were carried out with them. Additionally, parents and a teacher were interviewed, in order to get adults’ perspectives as well.

The insights gained in the research phase of this project were translated into design requirements for the design of empowering museum experiences for children regarding futures. In order to fit the needs of the final users of this guidance — design agency Opperclaes and the Co-Learning department of Nieuwe Instituut — the format of these requirements was improved through three iterative cycles. The result was Designers of the Future, a flexible toolkit meant to support its users during ideation and evaluation processes for museum experiences — such as the Co-Learning Expo.

This chapter will describe the key contributions of this graduation project, as well as its limitations and suggestions for future work (both research and design-wise) to build on this project’s foundations.

# Key contributions

This project set out to provide design guidance on how to engage children in speculation about futures through an empowering, transformative museum experience. In this section, the key contributions of this project will be discussed, relating to the elements of this project's design goal.

### *Providing design guidance*

Traditionally, design research outcomes consist on a series of design requirements, which are passed on to design practitioners somewhat unceremoniously. During this project, the usability of this format was put into question, as well as its appeal for its users. Thus, the research insights of this project were developed into a flexible toolkit, aiming to support designers and museum educators in the development of experiences for children. This toolkit can be used individually or within a team, as well as during different phases of a design process (namely ideation and evaluation). It therefore constitutes a more dynamic way of providing design guidance.

The format, actionability and validity of the toolkit were evaluated throughout multiple iterations. Final validation with design agency Opperclaes and an expert on co-design with children showed a positive reception towards it. Overall, it serves not only as a conversation starter — within the Co-Learning department, as well as Opperclaes, and between each other — but also a more concrete design brief or foundation to develop the Co-Learning Expo on.

Moreover, although this project could be regarded as highly context-specific, the knowledge generated within it contributes to several expanding fields of research. These include the design of transformative museum experiences for children, participation of children in museums and co-speculation with children. In that regard, this project could serve as inspiration, or even a starting point, for further research in these spheres. In this way, its contribution goes beyond the Co-Learning Expo alone.

### *... on how to engage children in speculation about futures...*

As with any endeavour that directly deals with futures, there is no one way to engage children in speculation. However, this project highlights some practices that have been identified as effective; some of the biggest challenges designers might find are also presented. Children often think of (and are talked to about) the future; one way to make futuring more attractive is to turn it into a game, giving them a challenge to solve. Presenting them with topics that are already interesting to them makes speculation more appealing; this thesis identified what some of those themes might be.

Children in ages 8-12 (the target group of this project) are still developing their abstract thinking skills. As such, one of the main difficulties designers need to account for is the need to make the future tangible for children. Otherwise, distant futures remain detatched from children's everyday reality, rendering the link between present actions and future consequences invisible. In addition to this, the diversity of children's abilities within this user group should be kept into account, as well as the many ways in which children like to express their ideas.

### *...through an empowering, transformative museum experience*

Transformative learning is a process which encompasses several different stages, in which people are faced with certain stimuli, invited to reflect, and given the space to experiment with new attitudes and behaviours, which they eventually integrate into their daily lives. People's journey through these stages can be supported through design; this project adds to the work being done in transformative museum experiences, focusing on children specifically.

Moreover, what 'empowering' means in this context was unpacked, positioning it within Kinnula et al. (2017)'s concept of educational empowerment, which centers children's competence-building. This project goes on to provide recommendations on how to support children's empowerment towards futures — namely by keeping these museum experiences open-ended, experience-focused, child-led and child-centered.



# Limitations

The limited timeframe of this project meant certain sacrifices had to be made, both in terms of scope and exhaustivity of the activities carried out. They will be briefly discussed this section; recommendations for future work will be given later in this chapter.

### *Diving into fields of study beyond design*

In the early stages of this project, it became apparent that the scope of the research questions went far beyond what the literature on interaction design could address. Some small incursions were made into other disciplines, such as (child) psychology, consumer research and future studies, even dipping my toes into pedagogy and environmental education. However, in order to avoid getting lost in the sea of literature, these explorations were not as thorough as would have been desired. This might mean, for instance, that the most prevalent theories for children's development were reviewed, but the main criticisms to each of them were not.

### *The struggles of participation*

Seeing as this project's main focus is in amplifying children's voices, participatory activities were given a high degree of importance in the project planning. Several challenges were encountered, namely the recruitment of children in a country where my personal network consists mostly of students, as well as a language barrier between the children and me. This affected the participatory activities in three ways, which have implications for the validity of this project's findings. First, the number of children that could be reached (33) was smaller than would be ideal, and although the participants were very diverse in terms of cultural background, the same cannot be guaranteed regarding socioeconomic status. Secondly, 30 of those children studied in a Montessori school; this might mean the insights are not representative of children with different educational backgrounds. Finally, language barriers made it so that most of the communication between the children and myself had to be mediated through a teacher. This means a certain amount of contextual information was lost, and children's responses were filtered by the teacher's understanding of what would be relevant to me.

Overall, having more in-depth interviews with children, as well as follow-up sessions with the same participants would have been desirable. Fortunately, this is something that the Co-Learning department will be able to do during the process leading up to the Co-Learning Expo.

### *Children's agency within the project*

Within this project, frameworks for participation in Speculative Design (Farias et al., 2022) as well as children's empowerment through Participatory Design (Kinnula et al., 2017) have been reviewed. In them, participant's initiation and leadership over the design process are regarded as the highest degrees of participation possible. However, these are challenging to reach in any case; much more so when the participants are children. Despite this, it should be stated that the participatory activities carried out within this project could not be carried out in the ideal manner, which would have given children much more control over the process.

# Future work

This project made the first steps in exploring how to engage children (aged 8 to 12) in speculation about futures, through an empowering, transformative museum experience. However, as it often happens with research, every new answer comes accompanied with ten more new, exciting questions. In addition to that, it has been established that the scope and timeframe of this project brought with it certain limitations. This section will present further directions of study, as well as provide recommendations on the next steps for the Co-Learning Expo.

### *Children's takeaway of the Co-Learning Expo*

A core element of transformative learning is the fact that the new perspective or attitude that is adopted becomes integrated, and therefore long-lasting. Within the framework of transformative museum experiences, this can be supported through design by focusing on the after-care following a museum visit. How can we make what is learned within the museum remain present to visitors afterwards? Which is to say, how can children be reminded that they have the power to create futures after they have visited the Co-Learning Expo? What is their takeaway?

In earlier stages of this project, the following design opportunity was identified:

> *D.O. – Children could have a tangible takeaway from the experience, so they can show their parents or other family members.*

It initially emerged from interviews with parents, who mentioned how their children enjoyed showing them what they had learned during museum visits, or else 'showing off' for them at the museum. Looking at the literature on transformative learning, it seems this would be a great way to support the later stages of children's transformative experiences. Furthermore, in discussion with an expert on co-design with children, he remarked how if we focus on empowerment as competence building, some sort of follow-up to the museum experience would be greatly beneficial for children.

Therefore, one last requirement is formulated: Children should be encouraged and supported in thinking about futures beyond the museum visit itself. How this could be done could take many shapes: periodic follow-up events or workshops, activities to do at home or at school, a physical souvenir that serves as a reminder... An additional iteration of the Designers of the Future toolkit is recommended, in which this long-term accompaniment of children's transformation becomes the 9th design challenge of the Co-Learning Expo.

### *Children's perceptions and attitudes towards the future — bigger, more diverse group*

As has been discussed before, one of the main limitations of this project has been the scope of the participatory activities with children — in terms of number and diversity of participants, as well as variety, duration and sequence of activities carried out. It would be much advised to tinker with and replicate the experiments of this graduation project with a broader sample. Another recommendation would be to design a sequential participatory process, where the same children continue to be involved, since children's Future Literacy grows as they become sensitized to the topic. Additionally, it is strongly suggested to further explore how to accompany children in linking everyday, present actions to big-scale, future effects.

### *Intergenerational interactions within the Co-Learning Expo*

This project's child-centered perspective is quite salient. Children being its one and only focus was an intentional choice — both because the Co-Learning Expo should be made "with and for children" and because of time constraints. However, a deeper understanding of the social contexts in which children will visit the exhibition (with their class or with their families) would be highly useful during its development process. The Co-Learning Expo has the potential to foster intergenerational conversations about futures. One potential pitfall of this, however, would be for parents and museum educators to adopt their traditional pedagogic role, conflicting or taking away from children's experience-based approach. How to avoid this and create meaningful, open dialogue about futures between children and adults is a very interesting direction to venture into.

### *New technologies and children's expression*

Children's different ways of expression came into discussion many times throughout this project. During interviews with parents, it was found that many adults still associate the concept of 'creativity' with analog, drawing, paper-and-scissors sorts of activities. Nonetheless, many children nowadays participate in games that involve some sort of digital building (such as Minecraft, for example). New technologies can serve as a medium for children to express their creativity and come up with their own worlds and stories.

When it comes to participation in museums, this 'old-fashioned' vision of creativity is still very much present. So one question I would like to put out is: how might new technologies allow museums to receive children's input in unconventional ways? And how could that help participation become more attractive, more engaging, and richer?

# Personal reflection

As this project comes to an end, I feel like the learnings I got from it perhaps cannot be put into words fully. In the last five months, I have been challenged and inspired in equal measure, and I am very grateful to have had this opportunity.

This adventure started from my love for heritage institutions, which have been my (un)official playground since I was very young. I discovered participatory design methods during my studies, and developed a passion for them. I started to wonder, how could heritage creation become more participatory? And would that not be a reaffirming and empowering dialogue for communities to enter? Then, I was lucky to meet Arnold Vermeeren, who introduced me to the world of transformative museum experiences.

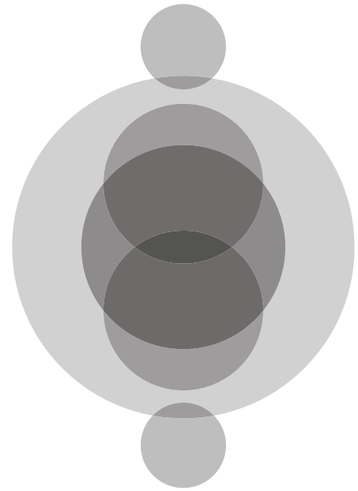
Thanks to this graduation project, I was able to immerse myself in the behind-the-scenes of the cultural heritage world. Not only that, but I got to experience first-hand what participation can look like within a museum such as New Instituut. The challenges that come with it are many, but the one that struck me the most was the matter of who initiates these processes. How can institutions, whose work is sometimes so tied to long-term plans and bureaucratic operations, make space for communities who want their voices heard? In the case of the Co-Learning Expo, how could children take the lead in the development process?

This project has also marked a significant pivot in my identity as a designer. It came as a bit of a shock (and not without a few tiny crises) to come to the realization that I finished my Masters with a design research thesis. It makes sense, however, since I came to TU Delft because I wanted to understand *why* I was designing things. As my mentor reminded me, this is only a project, not my practice — but I see now a path for it that I did not before.

Learning to advocate for the importance of design research has been a challenge. Everyone at Nieuwe Instituut received it with an open mind, which was incredible to experience. It was scary and exciting to venture out beyond the “designer bubble” and navigating cultural differences, as it were. This process has made me realize the importance of making desing research accessible to people from different disciplines, so that we can work together at the intersections of our fields.

On another note, I want to take a moment to remark how rewarding working with kids during this project has been. We hear a lot of things about how children nowadays are more and more individualistic, and have things too easy. This statement could not fit less with the children I met, who were endlessly curious, kind and bright. It was a joy to learn about their dreams, hopes and fears. I take with me a strong confidence in future generations.

All throughout this process, I had many talks with colleagues and friends about the future, and what it means to be a child nowadays. Should we shelter children from knowing about what is coming (and could we, even if we wanted to)? I personally do not believe that is the answer. What I hope is that we can give children the chance to just *be children* — to keep asking questions and dreaming dreams. I believe that we can find a million ways to help them do that; this was my attempt.



# References


## A

Acuff, D. S., & Reiher, R. H. (2000). *What Kids Buy and why: The Psychology of Marketing to Kids*. Free Press.

Anderson, D., Piscitelli, B., Weier, K., Everett, M., & Tayler, C. (2002). Children's museum experiences: Identifying powerful mediators of learning. *Curator: The Museum Journal, 45*(3), 213–231. https://doi.org/10.1111/j.2151-6952.2002.tb00057.x

Andre, L., Durksen, T., & Volman, M. L. (2016). Museums as avenues of learning for children: A decade of research. *Learning Environments Research, 20*(1), 47–76. https://doi.org/10.1007/s10984-016-9222-9

Artefact Group. (n.d.). *The Tarot Cards of Tech: Discover the power of predicting impact*. https://www.artefactgroup.com/case-studies/the-tarot-cards-of-tech/

## B

Bergevin, J. (2018). *Narratives of Transformation: Reframing and naming the impact of activist museum practice on visitors*. [PhD thesis, University of Leicester]. British Library EThOS. https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.771043

Bødker, S. (2003). A for Alternatives. *Scandinavian Journal of Information Systems*, *15*(1), 1.

Bryant, E. (2011). A museum gives power to children. *Curator: The Museum Journal*, *54*(4), 389–398. https://doi.org/10.1111/j.2151-6952.2011.00103.x

## C

Cesário, V., & Nisi, V. (2022). Designing with teenagers: A teenage perspective on enhancing mobile museum experiences. *International Journal of Child-Computer Interaction, 33,* 100454. https://doi.org/10.1016/j.ijcci.2022.100454

ChildFund Alliance, Eurochild, Save The Children, UNICEF, World Vision. (2021). *Our Europe, Our Rights, Our Future: Children and young people's contribution to the new EU strategy on Rights of the Child and the Child Guarantee.* UNICEF. https://www.unicef.org/eu/reports/report-our-europe-our-rights-our-future

## D

De Franco, M. T., Dominguez, C. R., Inglez, G. C., Cizauskas, J. B., Gonçalves, V. M., & Bizerra, A. F. (2019). Children as curators: How to incorporate Young visitors' voices into the elaboration and evaluation of a microbiology exhibition. *História, Ciências, Saúde-Manguinhos*, *26*(1), 85–101. https://doi.org/10.1590/s0104-59702019000100006

Demneh, M. T., & Darani, Z. H. (2020). From remembering to futuring: Preparing children for anthropocene. J*ournal of Environmental Studies and Sciences*, *10*(4), 369–379. https://doi.org/10.1007/s13412-020-00634-5

Dunne, A., & Raby, F. (2013). *Speculative everything: Design, fiction, and Social Dreaming*. MIT PRESS.

## F

Falk, J. H., & Dierking, L. D. (2018). *Learning from museums*. Rowman & Littlefield.

Farias, P. G., Bendor, R., & van Eekelen, B. F. (2022). Social dreaming together: A critical exploration of participatory speculative design. *Proceedings of the Participatory Design Conference 2022 - Volume 2*. https://doi.org/10.1145/3537797.3537826

Finke, C. M. & Sliwa, A. S. (2022). *Visioning workshop for a sustainable future for Østerbro* [Master's Thesis, Aalborg University Copenhagen]. https://projekter.aau.dk/projekter/en/studentthesis/visioning-workshop-for-a-sustainable-future-for-oesterbro(326e17c3-7470-4073-8ae9-5defe84933fa).html

Freedman, G. (2000). The changing nature of Museums. *Curator: The Museum Journal*, *43*(4), 295–306. https://doi.org/10.1111/j.2151-6952.2000.tb00013.x

## G

Gielen, M. (2013). Mapping children's experiences: Adapting contextmapping tools to child participants. *Nordes, 1*(5).

Gaggioli, A. (2015). 6. Transformative experience design. *Human Computer Confluence*, 97–122. https://doi.org/10.1515/9783110471137-006

Gardner, H., & Hatch, T. (1989). Educational implications of the theory of multiple intelligences. *Educational researcher, 18*(8), 4-10. https://doi.org/10.3102/0013189X018008004

Groninger Museum. (n.d.). *Kinderbiënnale.* https://www.groningermuseum.nl/kinderbiennale

## H

Häggström, M., & Schmidt, C. (2021). Futures literacy – to belong, participate and ACT! *Futures, 132*, 102813. https://doi.org/10.1016/j.futures.2021.102813

Harrington, C., & Dillahunt, T. R. (2021). Eliciting tech futures among Black Young Adults: A case study of remote speculative co-design. *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*. https://doi.org/10.1145/3411764.3445723

Howell, N., F. Schulte, B., Twigger Holroyd, A., Fatás Arana, R., Sharma, S., & Eden, G. (2021). Calling for a plurality of perspectives on design Futuring: An un-manifesto. *Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems*. https://doi.org/10.1145/3411763.3450364

## I

Interaction Design Foundation. (n.d.). *Design Guidelines.* https://www.interaction-design.org/literature/topics/design-guidelines

Interaction Design Foundation. (n.d.). *Participatory Design*. https://www.interaction-design.org/literature/topics/participatory-design

Iversen, O. S., & Smith, R. C. (2012). Scandinavian participatory design: Dialogic curation with teenagers. *Proceedings of the 11th International Conference on Interaction Design and Children*. https://doi.org/10.1145/2307096.2307109

Iversen, O. S., Smith, R. C., & Dindler, C. (2017). Child as protagonist: Expanding the role of children in participatory design. *Proceedings of the 2017 Conference on Interaction Design and Children*. https://doi.org/10.1145/3078072.3079725

## K

Kinnula, M., Iivari, N., Molin-Juustila, T., Keskitalo, E., Leinonen, T., Mansikkamäki, E., Käkelä, T. & Similä, M. (2017). Cooperation, Combat, or Competence Building: What Do We Mean When We Are 'Empowering Children' in and through Digital Technology Design? *Thirty eighth International Conference on Information Systems, Seoul 2017*.

## L

Liedgren, J., Desmet, P., & Gaggioli, A. (2023). Liminal design: A conceptual framework and three-step approach for developing technology that delivers transcendence and deeper experiences. *Frontiers in Psychology, 14*, 1043170.

## N

Nohl, A.-M. (2014). Typical phases of transformative learning: A practice-based model. *Adult Education Quarterly, 65*(1), 35–49. https://doi.org/10.1177/0741713614558582

## M

Miller, R. (2018). *Transforming the future: Anticipation in the 21st Century*. Taylor and Francis.

## O

Opperclaes (n.d.). *About.* https://opperclaes.nl/#gallery-78

## P

Piaget, J. (1964). Part I: Cognitive development in children: Piaget development and learning. *Journal of Research in Science Teaching*, *2*(3), 176–186. https://doi.org/10.1002/tea.3660020306

## S

Sanders, E. B. N., & Stappers, P. J. (2012). *Convivial toolbox: Generative research for the front end of design*. Bis.

Schaper, M.-M., Santos, M., & Pares, N. (2018). Orchestrating experts' assumptions and children's values in the design of Virtual Heritage Experiences. *International Journal of Child-Computer Interaction, 17*, 5–15. https://doi.org/10.1016/j.ijcci.2018.02.001

SEGD. (n.d.). *What is Information Design?* https://segd.org/what-information-design

Simon, N. (2010). *The Participatory Museum*. Museum 2.0.

Sitzia, E. (2016). Narrative theories and learning in contemporary art museums: A theoretical exploration. *Stedelijk Studies, 4,* 1-15.

SMAK. (n.d.). *De Tentoonstelling: De Kleine Catalogus van de Collectie van S.M.A.K*. https://smak.be/nl/tentoonstellingen/de-kleine-catalogus-van-de-collectie-van-s-m-a-k-de-tentoonstelling-deel-1

Smith, S., & Ashby, M. (2020). *How to future: Leading and sense-making in an age of hyperchange*. Kogan Page Inspire.

## U

UNESCO. (n.d.). *Futures Literacy: An essential competency for the 21st Century.* https://en.unesco.org/futuresliteracy/about

Uprichard, E. (2008). Children as 'being and becomings': Children, childhood and temporality. *Children & Society, 22*(4), 303–313. https://doi.org/10.1111/j.1099-0860.2007.00110.xV

Van Dorp, E. (2010). *Contextmapping an abstract future with children* [Master's Thesis, TU Delft]. https://repository.tudelft.nl/islandora/object/uuid%3A387e-6c7d-d727-4644-926c-a6007c1f76be?collection=education

Van Mechelen, M., Gielen, M., Vanden Abeele, V., Laenen, A., & Zaman, B. (2014, June). Exploring challenging group dynamics in participatory design with children. In *Proceedings of the 2014 conference on Interaction design and children* (pp. 269-272).

Van Mechelen, M., Have Musaeus, L., Iversen, O. S., Dindler, C., & Hjorth, A. (2021). A systematic review of empowerment in child-computer interaction research. *Interaction Design and Children*. https://doi.org/10.1145/3459990.3460701

Ventä-Olkkonen, L., Iivari, N., Sharma, S., Molin-Juustila, T., Kuutti, K., Juustila-Cevirel, N., Kinnunen, E., & Holappa, J. (2021). Nowhere to now-here: Empowering children to reimagine bully prevention at schools using critical design fiction. *Designing Interactive Systems Conference 2021*. https://doi.org/10.1145/3461778.3462044

V&A Museum. (2023, March 1). *Young V&A – Countdown to Summer 2023*. The V&A Blog. https://www.vam.ac.uk/blog/news/young-va-countdown-to-summer-2023

## W

Wolf, B., & Wood, E. (2017). Integrating scaffolding experiences for the youngest visitors in museums. *Early Learning*, 29–37. https://doi.org/10.4324/9781315429977-4

## Z

Zielhuis, M., Visser, F. S., Andriessen, D., & Stappers, P. J. (2022). Making design research relevant for design practice: What is in the way?. *Design Studies, 78*, 101063

# Figure Index

# Appendices Overview



Note: the appendices of this report can be found in a separate document in the TU Delft repository.