



# Playful learning through designing toys

Developing a design education toolkit for a non-profit organisation in rural Kenya

M.B. Westerhof

## Master Thesis

Design for Interaction  
Industrial Design Engineering  
Delft University of Technology

### TU Delft Supervisors

Chair: A.G.C. van Boeijen PhD  
Mentor: M.A. Gielen MSc

September 2020 - March 2021



# Executive Summary

Sustainable Rural Initiatives (SRI) is a non-profit organisation in Okana, a rural community in West Kenya. SRI provides the community members of Okana with opportunities to develop practical skills such as carpentry and tailoring. SRI also works with international partners with specific expertise to give local community members opportunities to develop skills they would otherwise not have had. In all these efforts, there is a strong focus on reflecting the culture, surroundings, and values of the community.

Play is an important aspect of how children develop and make sense of their surroundings. Toys are tools through which play is facilitated, but making toys itself is a common form of play too. The literature on play suggests that by providing kids with joyful, engaging, iterative and socially interactive play experiences, adults can guide children's play to help children develop skills directly involved with that play experience, but also more general learning-to-learn skills.

My project had two goals; the first was to give children the opportunity to develop design skills in a fun and playful way. Design is an exciting medium for kids to develop several valuable design skills, that are broadly applicable. The second was to give SRI the tools and practical knowledge to provide children with design activities through which they can develop those skills, both now and in the future.

To reach these goals I designed a toolkit, consisting of a manual and several videos, that allows SRI to

organise playful design workshops for kids to help the children develop these design skills. In the workshops, the children design toys from materials such as clay and wood, that are available around SRI's community centre.

In the workshops the design process is structured in three phases. In the first phase, a topic is introduced through a video, that then poses several questions to help the kids discuss that topic. These discussions help them to make their goal concrete, as they practise working together. In the second phase they build and test their idea. The kids first gather materials, and then use those materials to prototype their toy. They practise making their ideas tangible and learn from making mistakes. Finally they present their designs to each other, allowing the others to ask questions and give feedback. In doing so, they practise their communication skills and their capacity to reflect.

From the third workshop onward, the facilitator has to introduce the topic and questions to the children himself, replacing the video. The facilitator can find suggestions for topics and stories in the manual to help him come up with other challenges for the kids.

This toolkit gives children in Okana a fun pastime through which they are introduced to the design process, and can develop valuable design skills. This toolkit has given SRI the knowledge and tools to host those workshops. It has also given SRI a model they can use to effectively transfer knowledge from external partners to the local community.

# Table of Contents

Executive Summary	I
Table of Contents	II
Foreword	III
<b>1. Introduction</b>	<b>1</b>
1.1 Design Brief	2
1.2 About this project	3
1.3 Motivations & Considerations	4
<b>2. Explorations</b>	<b>5</b>
2.1 Defining the scope of the project	6
2.2 Questions and approach	8
2.3 Understanding the context and culture	11
2.4 Understanding play	14
2.5 Understanding toys	16
2.6 Playful education of design skills	19
2.7 Co-exploration activities	25
2.8 Meta-analysis of activities	32
2.9 Insights from explorations	34
<b>3. Vision</b>	<b>36</b>
3.1 Turning Insights into Goal	37
<b>4. Conceptualisation</b>	<b>39</b>
4.1 Ideation	40
4.2 Minimum Viable Product (MVP) Overview	41
4.3 MVP Evaluation	45
<b>5. Final Concept</b>	<b>49</b>
5.1 SRI Workshop Toolkit	50
5.2 Organising Design Workshops	51
5.3 Facilitator Manual	52
5.4 Supporting Videos	53
5.5 Challenge Sheets	55
<b>6. Evaluation</b>	<b>58</b>
6.1 Approach to Evaluation	59
6.2 Workshop 2: Video	61
6.3 Workshop 3: Challenge Sheet	65
6.4 Evaluation with stakeholders	69
6.5 Evaluating on the four pillars	70
6.6 Design recommendations	71
<b>7. Discussion &amp; Conclusions</b>	<b>72</b>
7.1 Discussion of Project, Design, and Results	73
7.2 Personal Reflection	75
7.3 Acknowledgements	76
<b>8. References</b>	<b>77</b>
8.1 Literature	78
8.2 Figures	79
<b>9. Appendices</b>	<b>80</b>
Appendix 1 - Minimum Viable Product (MVP) Facilitator Guide	81
Appendix 2 - Storyboard MVP Video	83
Appendix 3 - Final Concept: Manual	89
Appendix 4 - Final Concept: Recruitment Videos	98
Appendix 5 - Final Concept: Storyboard Workshop 2 Video	103
Appendix 6 - Facilitator Guide Workshop 2	106
Appendix 7 - Original Design Brief	108

# Foreword

Throughout this report I demonstrate the work I have done during my graduation project for Sustainable Rural Initiatives (SRI). It is organised in a way that takes you along on the journey I went through. Because of the COVID-19 pandemic, I couldn't visit SRI during the project's duration. Because of this, we first had to find a way to make this collaboration yield the in-depth insights and profound results we desired. Despite the occasional difficult moments, I am happy with the result. I am thankful I had the opportunity to work on such a beautifully rich and diverse project with people who were sincerely committed to this organisation's vitally important mission, and for the fact that I had two highly involved supervisors to support me.

I think the project's final results are valuable for Sustainable Rural Initiatives and the children who took part in the activities. But I can definitely say this project has had a profound impact on me. I hope that shows when you read this report.

*Marten Westerhof*

# 1. Introduction

1.1 'Design Brief' introduces you to the project's assignment.

1.2 'About this project' explains how the project came to be, what it aimed to bring about, and who were involved.

Finally in '1.3. Motivations & Considerations', I discuss my motivations for doing this project, and the considerations in regard to the project and the way it was done.



# 1.1 Design Brief

**In short, the design brief for this project was:**

- **To give children the opportunity to develop design skills in a fun and playful way by designing toys.**
- **To give SRI the tools and skills to provide design activities to the children through which they can develop design skills, both now and in the future.**

The aim of this project was to create a toolkit that allows kids of 6 to 12 years old (primary school age) in rural West Kenya to playfully develop skills associated with design such as their analytical ability and creativity. At Sustainable Rural Initiatives' community centre (SRI) in Okana, Kenya, kids will do so by taking part in workshops in which they design toys.

Our aim was to be able to offer a fun activity from which they could also learn design skills. The skills that the kids develop are broadly applicable, and also give them confidence in their ability to come up with ideas they can make reality with just what is available around them.

The considerations that went into shaping and further exploring this topic are described in chapter 2.1.

# 1.2 About this project

## How this project came about

Sustainable Rural Initiatives (SRI) is an organisation in Okana, West Kenya. The organisation aims to provide the local children, youth, adolescents, and adults of Okana a place to come together, practise sports, and the opportunity to develop their academic and practical skills through their library, woodworking, and tailoring space. Other examples of SRI's work are collaborating with government institutions to educate the local community on topics such as (reproductive) health, teaching sustainable agricultural methods, and hosting exams and sporting events for local schools.

James Otieno Jowi, the founder of SRI, initiated this project with the intention to reach more children to involve them in SRI's activities. His original plan was to ask me to design children's toys inspired by the local culture, that could then be produced and sold by SRI. Together with my supervisors and SRI's founder we decided to shift the project's focus from designing a toy to be built and sold there, to an educational toolkit that would allow SRI to teach children design skills. The considerations that went into this are explained in greater detail in chapter 2.1 on page 6.

## Stakeholders

**The final design knew two main users:**

- 1. The children who come to SRI**
- 2. The SRI facilitator**

The main target users of this project are the kids and the SRI employee who will guide them through the process of designing their toys.

The kids are all in the primary school age category; 6 to 12 years old. For this project's final result it was of great importance to get in contact with these kids to understand their surroundings and lived experience.

The other target user is the SRI staff member at the community centre who would organise the educational design activities for the children. The facilitator will be the one organising these activities and guiding the kids in their design process.

I too had a stake in steering the outcome of this project in a specific direction. I thought this would make for an interesting project, as it allowed me to dive into topics close to my heart: design, education, learning, and it would give me the opportunity to experience different cultures. I felt thankful that my work would benefit a cause SRI truly saw as important, as they had initiated this project. But I had to balance that with my own interest of doing a design project and delivering a design and report that would allow me to graduate. Finding a way to honor the interests of everyone involved was an interesting, exciting and sometimes challenging experience.



# 1.3 Motivations & Considerations

## Motivations

I hope this project's result will allow SRI to offer children a fun activity that inspires them to build, tinker, and explore while practicing their creative skills. For me it was a great opportunity to come in touch with a new culture, learn a lot about design, design education, and playful learning. It was interesting to do so through an organisation such as SRI. I'm very grateful to have gotten freedom to explore how I could best contribute to the valuable work that is being done at SRI's community centre from both my supervisors and the SRI staff.

## COVID-19 considerations

During the setup for the project, and during the project, COVID-19 was a constantly present variable that needed to be taken into account. This meant that travelling to Kenya to meet the people involved, doing context research, and organising user tests myself would be impossible. Other ways of exploring the context and collaborating with SRI's employees and the involved children had to be found, while ensuring the safety of everyone involved.

## Cooperating over the internet

Working in close collaboration with people almost 6500 km away meant that we had to figure out ways of working together that would work for everyone involved. Thankfully, SRI got a better internet connection at their community centre towards the middle of the project, which allowed me to get in touch with the people at SRI and the children more often. However, due to the limitations that this type of collaboration brings with it, the research and evaluation studies were always done by the partner at SRI. This of course means that almost all the data gathered in this project were interpreted by the partner at SRI, before they could be interpreted again and used for the further development of the design. The practical constraints of both the method and the context of the project are further explained in chapter 2.1.

## Cultural differences

Collaborating on a project such as this, with people coming from two different cultural backgrounds, requires sensitivity to the obvious, but even more so to the subtle differences between the people, and the way they experience their context. Even with the prior knowledge that one should be sensitive to these differences, it remains surprising what is taken as fact, how things are communicated, and on what aspects the focus may lie.

## Expectations

A difference in expectations became apparent from the way agreements were made and what those agreements meant. The main issue that we experienced during this project was related to the funding that was necessary for the (video) calls, sending and receiving of data, and who would be responsible for that. As the project was initiated by SRI, I expected operational costs such as those to be accounted for by SRI when we agreed upon the way of working. As SRI is a non-profit organisation, but perhaps also due to their history with working with student teams, they had the silent expectation of me finding funding for the project. I was however caught off guard by the sudden responsibility for, what in my eyes were, regular operation costs for this project. This was later solved when the university stepped in to pay for the operational costs of the project.

As these costs were not agreed upon beforehand, there was a discrepancy in expectations that caused a delay in the context research that I wanted to do. Additionally, it showed that relations and dependencies on each other in a project such as this are rarely clear-cut. As a result, especially during the first phase of the project, I spent a lot of time and energy on finding ways of working together that would still yield desirable results for both ends. I reflect on this in greater detail in chapter 2.8.

# 2. Explorations

In 2.1 'Defining the scope of the project', I describe the initial discussions and considerations we had when giving shape to the project.

In 2.2, 'Questions and approach', I discuss the questions that needed to be answered to get a good view of what was desired and necessary for SRI in regards to the brief.

These questions are then answered in the following order:

- 2.3 Understanding the context and culture
- 2.4 Understanding play
- 2.5 Understanding toys
- 2.6 Playful education of design skills
- 2.7 Co-exploration activities
- 2.8 Meta-analysis of activities
- 2.9 Insights from explorations



# 2.1 Defining the scope of the project

## Original scope

This project was initiated by Sustainable Rural Initiatives' (SRI) founder James Otieno Jowi. His original intention was to have a student at SRI to design toys that would fit with the local culture and could be manufactured at SRI to be sold. We further developed the project's setup and goals based on the questions that came up from this original plan, as we asked ourselves how we could bring the most value to SRI and the kids.

## Considerations

One of the reasons for initiating this project was the wish to be able to offer children more durable and culturally fitting toys. However, maybe the kids would have been very happy to have more 'cheap plastic' toys to play with that happen to be manufactured elsewhere, or not entirely based in their own culture. The project could then have been to bring those toys to them, or to make an effort to design such toys for them. This led to another topic that needed to be considered; the choice of material, which needed to be local and sustainable. SRI need to be able to actually produce them, while not burdening the environment. Besides offering children a toy, the toys could have functioned as 'showpieces' for potential (foreign) investors in SRI. They could be used to show those investors the attention that is given to honoring the local culture and environmental sustainability, things that are important on the agenda of (western) investors.

These considerations lead us to the economic aspect of the original project setup. Selling these toys could possibly lead to more funds for SRI, which they could invest in doing other things. However, as described later in this report, the financial viability of this would be doubtful. Also, the project would involve an almost built-in dependency, i.e. the sale of those toys, to be able to continue this or other projects. This also means that the kids would maybe not be able to reap the benefits of actually playing with those toys, unless a business model specifically aimed at that would be developed along with it.

In part due to considerations for environmental and economic sustainability, we decided it would be more valuable to find a different approach for this project. The chosen approach needed to translate these considerations into a project that would make for a more sustainable investment into SRI. The initiator's original intention was to manufacture the toys at SRI, after having been designed by me. That setup did have an interesting and promising aspect, which was the knowledge transfer involved in that process. Through changing the focus to knowledge transfer, we could take a more sustainable approach to the project and its prospected outcome.

## Knowledge transfer

Through a knowledge transfer approach we could tackle the aspects of financial and environmental sustainability. By transferring the skills and knowledge from the external partner, in this case me, to SRI, they would gain unique skills and knowledge rather than only giving them a design that needs to be executed and the 'expertise' thus remaining with me. Which materials the kids use to design could also create dependencies for SRI. By making use of materials that are locally available we tried to further limit the created dependencies. The question of what material to use also ties into the aspect of environmental sustainability. Originally SRI wished to make use of local, environmentally friendly materials to reflect the local culture better through the toys the kids play with, but also to appear appealing for (western) investments, as environmental sustainability is often a prerequisite.

The main topic thus became how to transfer valuable skills to both the SRI staff and the children. Inspired by the original toy design angle, we developed the idea that I could add the most value to SRI by designing a toolkit that would give SRI the skills and materials to offer children a fun and educational activity involving designing toys themselves.

## 2. Explorations

### Why toys?

We considered toys a good medium to introduce children to design skills. Toys can be relatively simple, and could thus be translated into design assignments with relatively low complexity. Toys would be relatable and motivating subject matter for the kids, as they have an important role in play. Play is an important part of how kids develop and make sense of their surroundings. Through play, children explore and learn the rules and symbols of their communities (Else, 2009). Another reason for the kids to design toys themselves are the cultural implications of the toys the kids play with. ‘Through play, children recreate roles and situations that reflect their sociocultural world, where they learn how to subordinate desires to social rules, cooperate with others willingly, and engage in socially appropriate behaviour. Over time, these competencies are transferred to children’s everyday behaviours’ (Fisher et al., 2011). Toys that are designed in and for other cultures are not necessarily unsuitable or undesirable for kids in other contexts to play with. However, it could be beneficial for kids to play with toys made in and based on their own surroundings, carrying local values, and making use of local materials. This led us to see toys as an opportune medium for teaching the children design skills, while also giving them toys that fit with their own surroundings and culture, as was SRI’s original intention.

### Skills for kids

There have been studies investigating how to teach children design skills, which are further explored in chapter 2.6. However, most of these programmes are focused on western contexts, mostly in classroom settings. The skills these programmes aim to teach the kids are considered to be valuable 21st century skills. Through designing toys, we explored how this could be done in a rural East African context. The exact skills are further explored and described in chapter 2.6.

### Skills for SRI employees

Besides the skills we aimed to teach kids, this project concerned a knowledge transfer to the SRI staff, so they would be able to continue teaching design skills to kids in the future as well. The people at SRI had to be made aware of design and gain a basic understanding of the design process, what skills they would be teaching the children, and develop didactic and creative skills to be able to guide children in their process of developing design skills. In the next chapter, I first explain what all the chapters in this section of the report pertain to, after which I describe the approach we took throughout the project to ensure the knowledge transfer was effective.

# 2.2 Questions and approach

## Questions

This chapter first gives an overview of the questions that are answered in this section of the report. After that, I describe the approach for exploring and designing that I used throughout this project.

In chapter 2.3 ‘Understanding the context and culture’, the questions relating to who the toolkit’s users are, what their context is like and what implications the local culture has for this project are explored.

In chapter 2.4 ‘Understanding Play’, the explorations that were done in the play are summarised, with the implications that has for the final design. First what we mean when we talk about play is defined. Next, its role in children’s development is explored and defined. This is needed to understand how to design playful experiences for the children. The chapter is concluded with an exploration of the differences in play across cultures, to be able to be sensitive to similarities and differences in the play I’m used to and that might be commonplace elsewhere.

In chapter 2.5 ‘Understanding Toys’, the differences between toys that are used in different cultures and economies are explored. Popular toys, games, and types of play across the world are explored, after which a look is taken specifically at toys that are

typical for Eastern Africa. That part is concluded with an exploration of what fun actually is, to understand how to offer something fun to the children.

In chapter 2.6 ‘Playful education of design skills’, ‘design’ is defined as a process for the purposes of the project. After that, the skills that are to be taught to the children are defined based on existing research into teaching children design skills. Next, the reasons for teaching children these specific skills are summarised. The chapter is concluded by a look into how that was already being done in practice.

I describe the research activities we did in chapter 2.7 ‘Co-Exploration Activities’. They were done mostly in parallel, but are also based on the insights from the preceding chapters.

In 2.8 ‘Meta-Analysis Activities’ I reflect on the interests of the stakeholders, the cultural differences, and the chosen approach to take into consideration when designing the final toolkit.

The section ‘Explorations’ is concluded by chapter 2.9 ‘Insights from explorations’, which summarises the conclusions from the this section.

## 2. Explorations

### Background of the approach

In the introductory meeting with the SRI employees we discussed the practicalities of organising how we would stay in touch during the project. It became clear that the practical constraints of working over the internet were more far reaching than discussed originally with the founder of SRI at the setup of the project. As it turned out no funds would be available for video calling for extended periods of time, at least until the second half of the project.

This meant that to explore the context, ‘interventions’ had to be prepared, after which they could be sent over Whatsapp. The SRI employee I worked with, henceforth referred to as ‘the facilitator’, would then execute these interventions, be that in the shape of an

exercise, workshop or other activity with the children. Finally, because of the lack of funds, the interventions that would be done as part of the explorations had to be done at almost no expense, and would thus remain low-fidelity.

### Collaboration with SRI

The facilitator was one of the main ‘target users’ of the project, besides the children. The nature of this collaboration meant that all my interactions with the children would be mediated by the facilitator. The facilitator thus had the important role of taking photos and videos, and translating and interpreting the things the kids said and did to allow me to see the effects of what I designed.

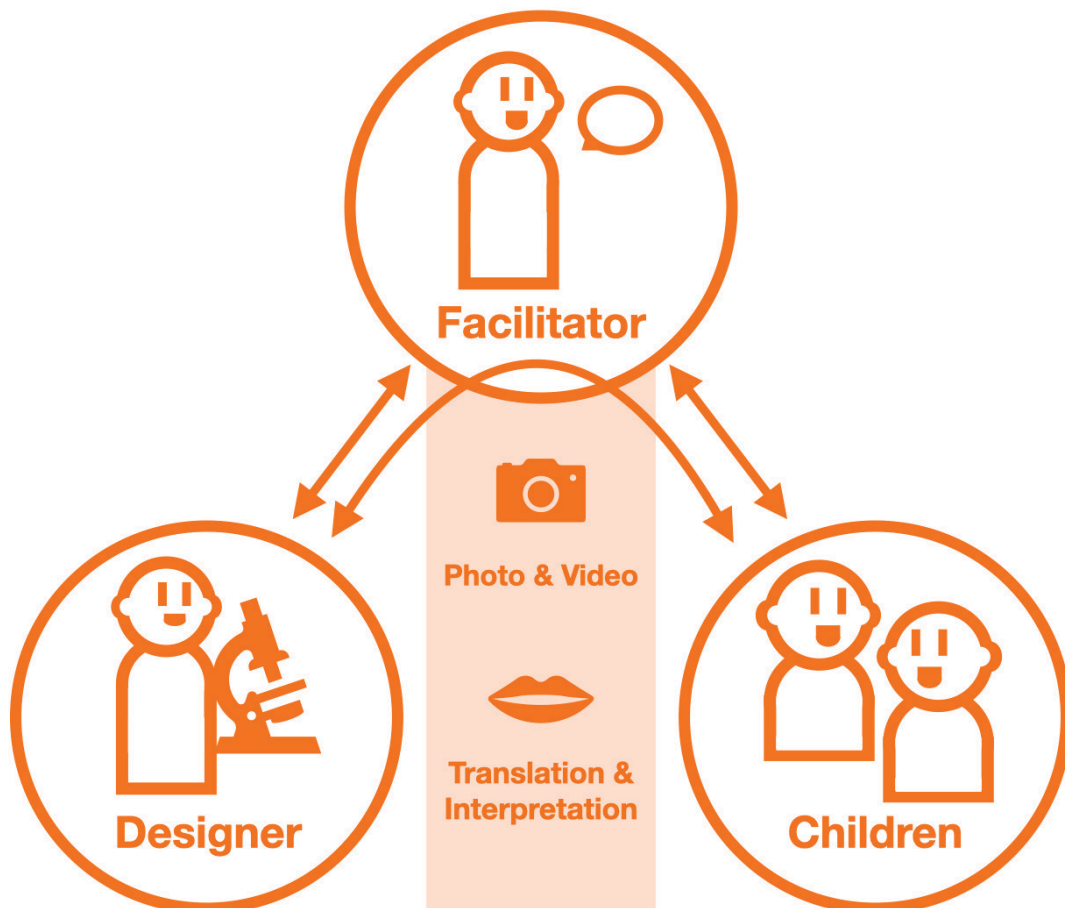


Figure 1: Visualisation of the roles of the involved parties

## 2. Explorations

### Approach

The explorations were done in an iterative way, which allowed me to continuously try out different methods and approaches for the design early on in the project through small ‘interventions’. These interventions gave me early insight into whether certain aspects of the designs had the intended effect, and the opportunity to change or improve them if that was not the case. On top of that, those interventions were designed in such a way that the results gave insight into the context of SRI and the lives of the children.

As the project was a collaboration purely over the internet, the interventions were an effective way to have direct communication with SRI’s employees and have, mediated, interaction with the children partaking in the activities.

This approach is illustrated in figure 2. It shows the continuous and iterative process through which the kids, the facilitator and I, the designer, went through

the design process. The children who joined the project would become increasingly acquainted with the project and design process. At the same time, the facilitator practised and figured out how to perform their facilitatory role they would fulfill during and after the project. Finally, it allowed me to get an insight into the context and to define the practical requirements of the final design.

### Supporting explorations

Because I was not able to travel to Okana to do typical context research, my insights came from conversations with SRI’s staff and several online resources. The online resources about Okana and SRI were limited to SRI’s website and materials such as the previous student reports from projects that were done at SRI. These explorations were augmented by literature and desk research, as is further described in the following chapters.

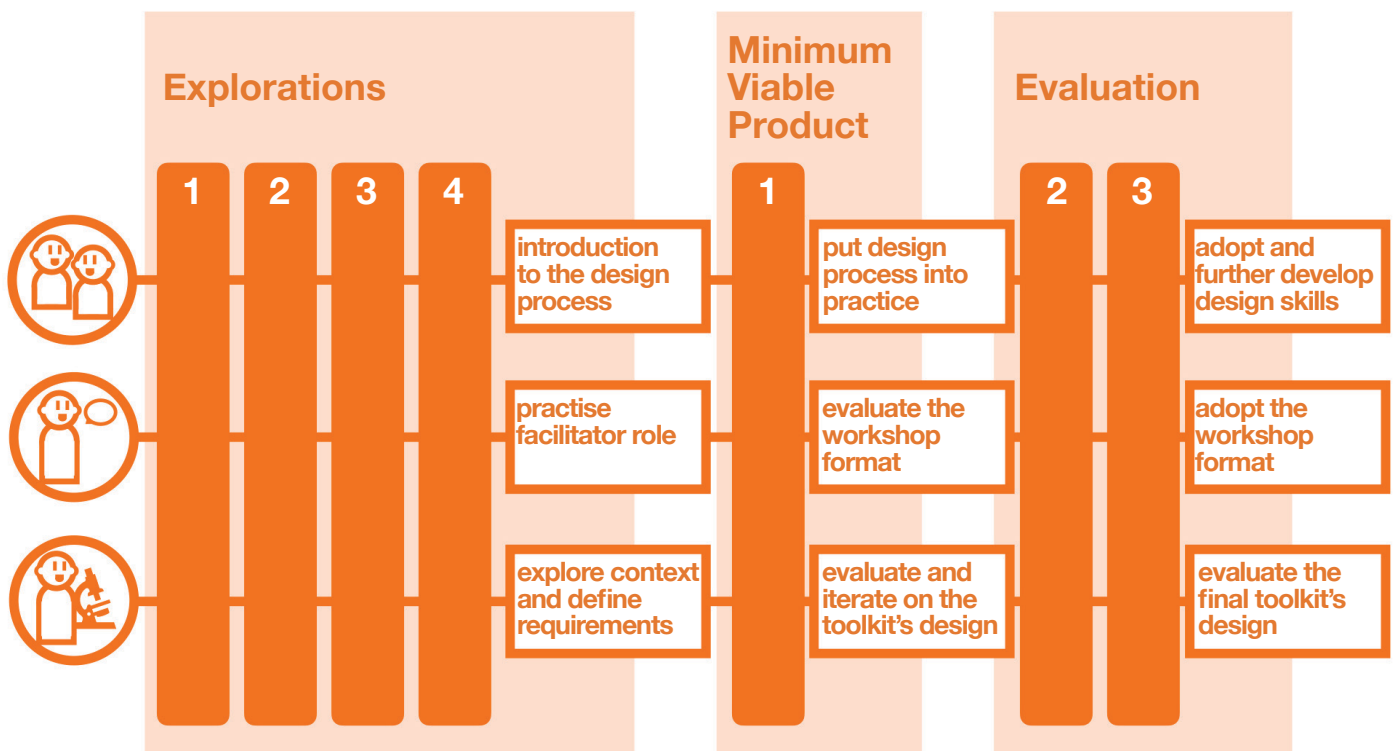


Figure 2: Exploration Approach; three sets of interventions with different goals

# 2.3 Understanding the context and culture

## Sustainable Rural Initiatives

This project was initiated by Sustainable Rural Initiatives (SRI), a nonprofit organisation located and operating from Okana, a rural community close to Kisumu, in Western Kenya.

It aims to improve the quality of life of the neighbouring rural communities and tries doing so by ‘tackling the complex challenges the community faces through direct contact with local community members’ (SRI Website, n.d.). The activities are run mainly by a few employees who are supported by volunteers. By using this bottom-up approach SRI aims to have a good understanding of the local issues, but also what talents, resources, and knowledge are at the disposition of the community. SRI collaborates with international partners that contribute by lending their expertise and invest in projects at SRI (SRI Website, n.d.).

## SRI’s history and activities

SRI operates from a community centre that was established through a graduation project by two students from TU Delft’s Architecture faculty in 2015 (Pavilions for Okana, 2015). In the pavilions built by the students SRI now hosts an office, a library for children, a tailoring studio, an ICT unit, a cafeteria and an outside community space. At the library and ICT unit, SRI hosts trainings in general computer skills. At the start of this project, there was no internet connection yet, but towards the second half of the project, there was an internet connection that allowed video calls.

In parallel to the community centre, a woodworking facility has been built. A TU Delft student team from Industrial Design Engineering looked into the viability of using that to produce and sell wooden products.

After these first two studies, there have been several



Figure 3: Impression of the SRI’s community centre



## 2. Explorations

other (student) projects involved with SRI, researching local issues and finding bottom-up solutions for them.

SRI currently runs projects that are aimed at teaching local community members practically valuable skills such as new farming techniques, carpentry, joinery, tillering, and masonry. SRI also collaborates with five partner schools in Okana to host sporting events and to offer the community centre as location for hosting exams.

Another field SRI focuses on is health, which is done through collaborations with the Kenyan government on promoting wellbeing for sexual and reproductive health, and by offerings sports activities to the kids and local youth. An example of this is the introduction of korfbal in collaboration with Dutch partners.

### Life in Okana

SRI is located in Okana, a rural community of about 5000 inhabitants (Okana Centre for Change, 2015). Okana is located in West Kenya, slightly east of Kisumu, near Lake Victoria. Most people in Okana are subsistence farmers.

Swahili and English are the official languages in Kenya, but the native language of the people in Okana is Luo. Most people do speak some Swahili and English, but proficiency is not always high.

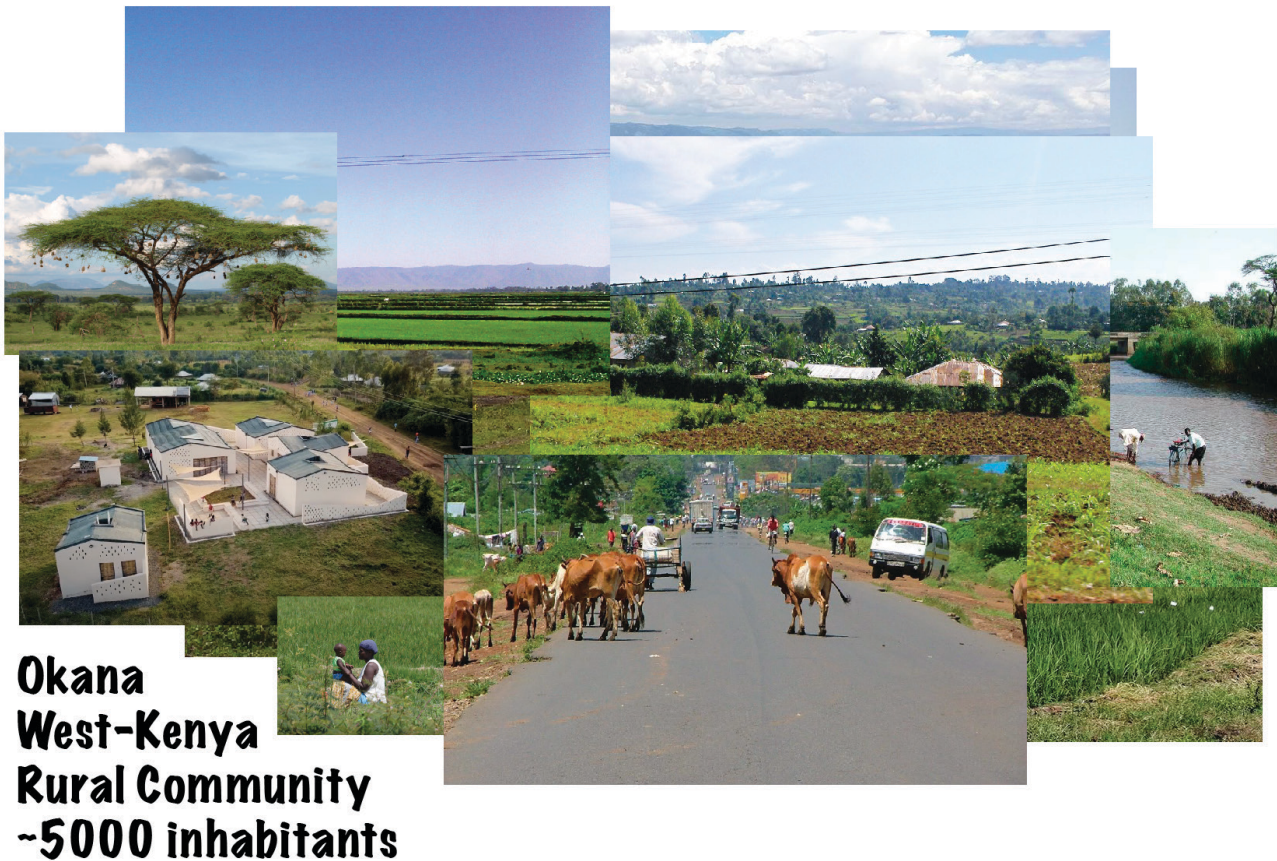


Figure 4: Impression of Okana 1

## 2. Explorations

### Target Users

#### Facilitators

The day-to-day operations at SRI are run by a small group of about five people. Some employees have the responsibility for the ICT facilities and library, while others are responsible for the logistics of the current projects. The founder of SRI remains the project initiator for the projects at SRI. One of these employees, who is usually responsible for the ICT facilities at SRI, was also responsible for helping me with the project. This meant he took many of the practical tasks upon him such as inviting children to the workshops and hosting the workshops at SRI's facilities. He was from a village an hour away, but now lived in Okana.

He was in his thirties and besides his ICT work, was highly committed to the children's education and helping them to develop ICT skills through workshops he hosted at SRI's community centre himself. He was the main user of the materials I made for the 'interventions'. His view and opinion on the materials were thus an important benchmark for the design of the toolkit, as he would be the person hosting the workshops for the purposes of this project, but also after that.

#### Children

The children that participated in the study range were from 8-12 years old. They live with their parents and on average have two or three siblings.

As result of a lockdown in response to the COVID-19 pandemic, all schools in Kenya were closed when the project was done. This had severe implications for the lives of the children of Okana. Before, they used to go to school five days a week, but now found themselves at home, deprived of education. Generally, in the mornings the children helped their parents with chores around the house, such as cooking and cleaning. Most families keep livestock, such as cows and chickens, that the children sometimes need to look after.

In the afternoons most children have time to play games with their siblings or friends in the neighbourhood. Football and rope skipping are favorites among the kids. If the kids come to SRI, they do so on their own accord, as they live in neighbourhood together with friends or siblings, on average about once a week. For this project, they were asked to come on specific afternoons by the facilitator, who would then host an activity in which the children did a design related activity.



Figure 5: Impression of Okana 2

# 2.4 Understanding play

## What is play?

Smith and Pellegrini (2013) describe play as an activity done for its own sake that children get enjoyment out of. Play is different from other activities such as exploration, work and games. In exploration children get familiar with their environment, in work there's a clear goal, and games are organised with specific rules and also have a goal.

However, adults can be involved in children's play, for example by providing play environments and toys. Smith and Pellegrini (2013) note the potential preliteracy benefits of play that can be enhanced by providing paper, crayons, and plastic letters. Exercise benefits of play can be enhanced by providing challenging forms of climbing apparatus, and creative play can be enhanced by providing lego-type bricks to stimulate creative construction activities. They refer to this as play tutoring, which thus involves offering children the right tools or environment to stimulate specific kinds of play that might benefit the children.

## The role of play in development

In a white paper by the Lego Foundation called 'The role of play in children's development: a review of the evidence', Whitebread et al. (2017) build on a wide variety of disciplines to argue the importance of play in children's development. In the review, the authors distinguish five different types of play: physical play, play with objects, symbolic play, pretend play, and games with rules. According to the authors, each of these types of play may have certain positive aspects in regards to specific areas of development:

- Perceiving an activity as play seems to lead to higher levels of joy and active engagement.
- Social interaction during play is sometimes linked to improved learning outcomes.
- Pretending may lead to improved outcomes because children make more meaningful links to their own knowledge and experience.
- Iterative play may lead to more creative, innovative ways of thinking and problem-solving.

They also distinguish five characteristics of play, that

they argue are the main factors that facilitate learning through play: 'joyful', 'actively engaging', 'socially interactive', 'meaningful', and 'iterative'.

## Learning through play

In another white paper by the Lego Foundation 'Learning through play: a review of the evidence', Zosh et al. (2017) conclude that 'learning through play can happen through free play and when adults or aspects of the environment structure the play situation towards a particular learning goal.'

Based on the research they reviewed, they argue that child development is interconnected across domains; development in one domain can lead to children being able to develop in other domains more quickly. A balance between content and skills is necessary for children. In this manner they make a distinction between 'surface', concerned with facts and principles, and 'deep' learning, understanding the implications in a real world context. Both skills and content are important across domains. The point is that they are all interdependent. New information or skills are learned better when it connects and expands on things we already know.

Built on the hypothesis that learning through play happens through joyful, actively engaging, meaningful, iterative, and socially interactive experiences, adults can offer children playful experiences in which children practise both these learning-to-learn skills, and the content for the kids to engage with. They conceptualise play and playful learning as a continuum with several regions, rather than types of play being distinctly defined containers. The types of play are plotted over the axis from free to more constrained, as illustrated in figure 6 on page 15.

## 2. Explorations

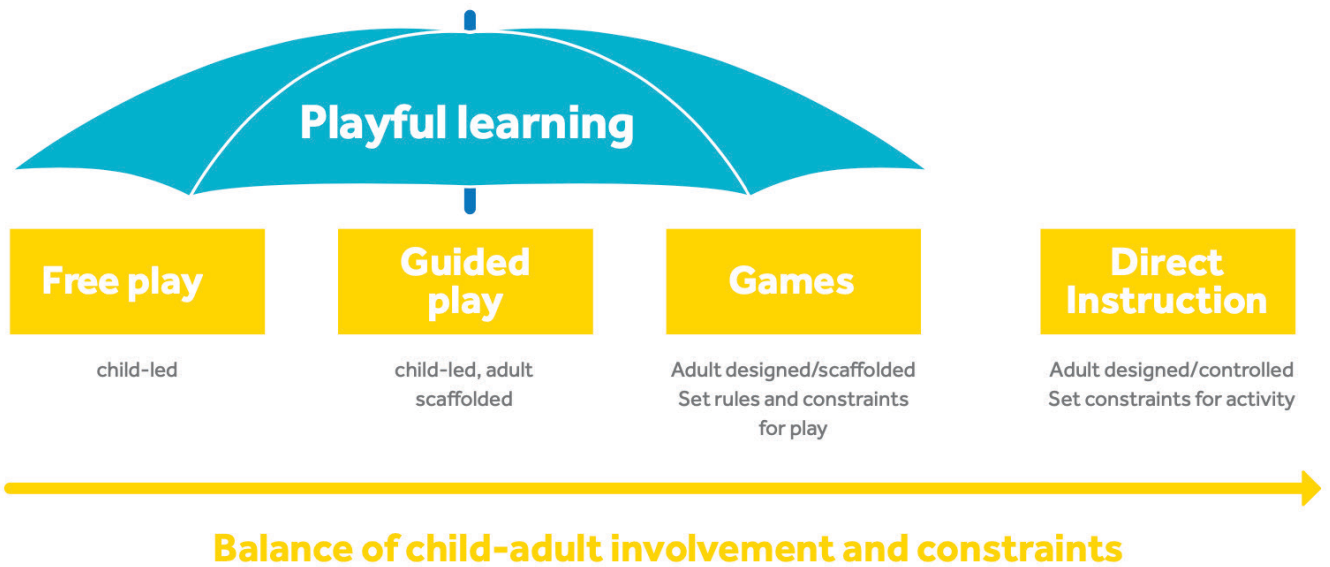


Figure 6: 'Balance of child-adult involvement and constraints' (taken from Zosh et al., 2017)

### Play across cultures

Gosso & Almeida Carvalho (2013) argue that playing is a universal phenomenon, a basic motivation and a legitimate right of children. They reviewed studies in different cultural contexts that highlight both universal features of play (such as the deep structure of traditional games/play activities and gender differences regarding play preferences and performance) and cultural variability, either introduced by the children themselves or constrained by the availability of time, space, objects and partners, reflecting the conceptions of each context about childhood and play (Gosso & Almeida Carvalho, 2013).

Roopnarine, Patte, and Johnson (2014) also conclude that play of children is a universal phenomenon. In their book 'International Perspectives On Children's Play' they say 'Whether it is by a riverbank in Kenya, on a migrant farm in the United States, or in a forest in Sweden, children seem to have an intrinsic drive to manipulate their physical environments, interact with peers and adults, and engage in imaginative activities, all in ways that are freely chosen and playful.'. Both thus argue that play itself is universal, but that the play is always influenced by the context

(physical and social geography) and culture (history, family structures and communities). Lubeck (1996) also makes a distinction between 'universal (but not uniform) child and the culturally constituted play.

### Context and culture

Roopnarine, Patte, and Johnson (2014) illustrate the role of context on children's play with the example of a classroom. The space, time, and materials that are provided by a classroom directly influence a child's play choices and activities. They also mention other, more indirect, aspects of a context that can affect children's play, such as policies, budgets, design students doing a graduation project, or the value system of the culture a child is growing up in. Even though the child might not be aware of these influences, they all impact the ways in which the universal drive to play is actualised by that particular child. They thus conclude that understanding the play of the children in any particular context or culture requires researching how children's play occurs in that specific context and what cultural factors might influence it.

# 2.5 Understanding toys

## What makes a toy fun?

Toys are tools through which play is facilitated. However, to have children design toys themselves is a different thing altogether. The tool I was to design to teach children design skills in a playful way, could be seen as a toy itself. It should elicit play with the five characteristics that facilitate learning through play: being joyful, actively engaging, socially interactive, meaningful, and iterative.

To do so, it was necessary to understand what distinguishes a fun toy from a boring one, and how to design one that is fun. Gielen (2010) argues that for designing worthwhile toys there are three major concepts that are important for designers to understand: 'aimlessness (the notion that play is focused on the process of an activity rather than on a necessary outcome of it), play value (the usability of a toy as a tool for play, generating diverse play opportunities that suit various children's needs, motivations and abilities), and empathy (the necessity to understand the concerns and motivations of children not only in a cognitive but also in an emotional way)'. The main goal for me became to design the process of making the toy itself have these characteristics, rather than the toy the kids designed being a 'great toy' that would have these characteristics.

Aimlessness at first might seem like it would be at odds with having a clear goal such as 'making a toy', especially since it should also be balanced with adult intervention aimed at structuring that process. However, when both are in service of giving the children freedom in the process of reaching that goal, the kids can still experience aimlessness; making the toy just because it is fun to do so.

Play value can in this case be understood as giving children the opportunity to put emphasis on specific aspects of the design activity, exploring what they find interesting, exciting, or challenging.

Empathy for the kids can for the purpose of designing this activity be understood as having a low investment to start and reflecting the relation the kids have to their surroundings. To make sure that is the case in the final

design, it is valuable to understand what kinds of toys children already play with in Kenya, and in what way they relate to those toys, and how those toys relate to their surroundings.

## Toys across different cultures

To understand what children play with in other cultures, I explored toys in different contexts and what cultural factors might influence that. For his project 'Toy Stories', Gabriele Galimberti visited multiple countries around the globe to photograph children with their toys. Despite being in no way exhaustive, it gives a valuable insight into what children play with, what their attitude is towards their toys and what the similarities and differences are across cultures (Galimberti, 2014).

I visually analysed the photos to gain an insight into what children play with and to be able to compare the countries with each other. The locations of the photographs I analysed are pinned on the map, and a selection of pictures are shown in Figure 7. The photos show that there are differences in the number of toys the kids have and the state those toys are in due to economic differences between the countries. However, a common denominator among the pictures is the pride that I perceive many of the children show when they are photographed with their toys. Having the children design their own toys, and allowing them to present their toy might be highly motivating.

The photographer has probably selected the toys the children pose with to be related to a specific topic for aesthetic reasons; e.g. cars, dinosaurs, and stuffed animals. However, what remains clear is the type of the toys that are in the pictures. They're representations of things (e.g. dolls, stuffed animals, cars, doll houses), toys mimicking tools for everyday activities for pretend play (e.g. stoves, cups etc.), and a few toys such as balls that can be used for a wider variety of games and types of play. Only two children are photographed with board games.



## Africa



Zambia



Kenya



Zanzibar

## Americas



United States



Nicaragua



Bolivia

## Europe



Sweden



France



Switzerland

Figure 7: A selection from 'Toy Stories' (adapted from Galimberti, 2014)

## 2. Explorations

### Toys in Eastern Africa

The available photographic material online of Eastern Africa related to play and toys in rural areas all mainly show a few specific types of toys. Examples are repurposed old tyres that are rolled around, or bottles and juice boxes that are used as footballs.

### Galimoto

The most striking example of the toys the kids play with is the 'galimoto', that often comes up in photos of playing kids in Eastern Africa. A galimoto is a car or other wheeled vehicle, usually made out of wire, twigs, or plastic bottles, that can sometimes be pushed along by a stick.

The children show their resourcefulness and creativity; they create their own toys. There has to be a 'design' process that has preceded having a car they are able to push around, which can be seen as integral part of the galimoto and this type of play. So is having children design their toys something different altogether? Apparently, that already is a typical form of play. But then the next question is: 'how can this process further be instrumentalised to teach design skills to the children without diminishing the fun of the process?'



Figure 8: Toys in East-Africa (adapted from Skidmore & Skidmore (2014))

# 2.6 Playful education of design skills

## What is design?

Designers often have unique processes and in turn there are also many different ways the design process is visualised by scholars. The model of the design process that I used for this project is visualised as a cycle that is made up of arrows, illustrating the iterative nature of the design process (figure 9). In this model, each arrow makes up a step of the process. The steps making up the design process are called: exploring & formulating the problem, generating & selecting ideas, generating & selecting concepts, building a prototype, testing & optimising, and presenting. This approach has the benefit of being well-documented, and being based on the 'basic design cycle' that I know from my own design education (van Boeijen, Daalhuizen & Zijlstra, 2020). This specific model has been developed for educational purposes with primary school pupils, structuring the process of going from a fuzzy problem situation to a concrete, tested solution.

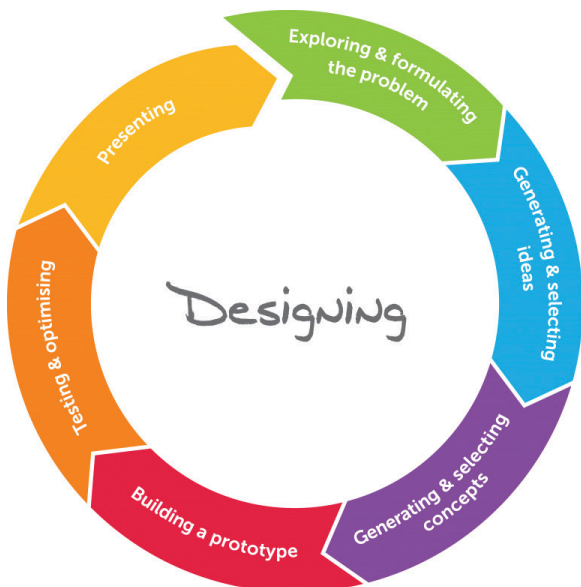


Figure 9: Design Cycle (from Klapwijk, 2017)

## What are design skills?

To design something requires different skills that can be defined in various ways. For the sake of focus and being able to effectively discuss them for the purpose of this project, it is valuable to define them concisely. Klapwijk (2017) described seven key design skills (figure 10) that are considered the most relevant for primary school pupils (Klapwijk & van den Burg, 2019):

- Thinking in all directions (divergent thinking)
- Developing empathy
- Making productive mistakes (early and frequent iteration)
- Making ideas tangible (convergent thinking)
- Sharing ideas (communication)
- Defining your direction
- Making use of the process (meta-cognitive skills)

All these skills are necessary at some point in the design cycle. Klapwijk describes how these design skills are 'closely related to 21st century skills, which are thought to be indispensable for thriving in our rapidly changing society.' (Klapwijk, 2017).



Figure 10: Design Skills for primary school kids (from Klapwijk & van den Burg, 2019)



## 2. Explorations

### What is the value of these skills?

Design projects are an excellent vehicle to develop creativity (Klapwijk, 2017). By doing design projects, kids will discover the uniqueness they can bring to these projects that have no predetermined answers. No other participants will come up with exactly the same idea and prototype as they do. This makes designing a meaningful activity for the participants, especially when design problems are related to their own lives. For pupils in the primary school ages, the design outcomes do not have to be new in the sense that they have never been thought of before. Most important is that pupils create outcomes and solutions that are new for them.

But the children will not only develop their creativity, and realise their ability to create something unique out of nothing, but they will also practise those specific skills. These skills have inherent value to the children, as they improve their ability to choose their own direction, do divergent and convergent thinking, collaborate and communicate, and practise iteration. Klapwijk, & van den Burg (2019) also mention these typical design skills overlap with '21st century skills' that are often mentioned by business leaders and politicians as important for the 21st century's rapidly changing job market.

A more ageless argument than this appeal to what a future job market might require, is to look at the humanist enlightenment view on education of Von Humboldt, as put by Noam Chomsky (2015):

'To be truly educated means to be in a position to inquire and to create on the basis of the resources available to you which you've come to appreciate and comprehend. That means knowing, understanding many things but also, much more important than what you have stored in your mind, to know where to look, how to look, how to question, how to challenge, how to proceed independently, to deal with the challenges that the world presents to you and that you develop in the course of your self education and inquiry and investigations, in cooperation and solidarity with others.'

Offering a fun activity to the children can be a valuable catalyst for their further education by sparking their curiosity, by giving room to their creativity, resourcefulness, and further encouraging these skills of independent enquiry and learning.

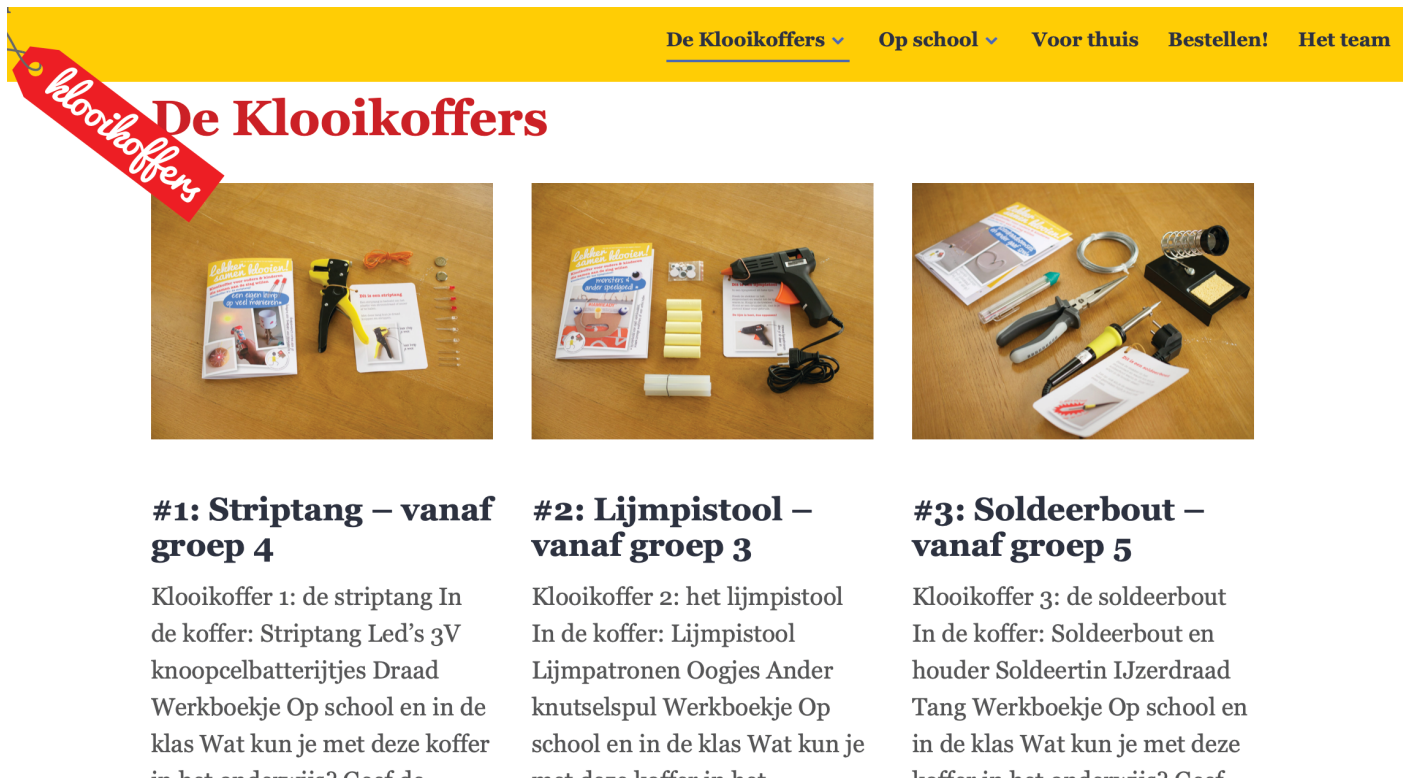
## 2. Explorations

### Existing Playful Design Education Tools

Several programmes exist that aim to teach these specific or similar skills to children. During this project I took inspiration from educational toys and games, and educational programmes that offer workshops and classroom materials. However, all of these toys are aimed at the western world.

### Klooi-koffers

Klooi-koffers (2020) (which translates to something like ‘mess-around-suitcases’) is a Dutch educational toy that gives children a small toolkit to tinker with. In the box there are some ‘real’ tools such as a soldering iron or a glue gun and instructions for a small project that the tool can be used for. The company offers a service through which schools can borrow the toolkits and gives teachers the materials to share the children’s creations online.



The image shows a screenshot of the website 'De Klooi-koffers'. At the top, there is a yellow navigation bar with the text 'De Klooi-koffers', 'Op school', 'Voor thuis', 'Bestellen!', and 'Het team'. Below the navigation bar, the title 'De Klooi-koffers' is displayed in a large, bold, red font. A red tag with the text 'Klooi-koffers' is positioned to the left of the title. Below the title, there are three images of toolkits, each with a corresponding description and list of contents.

**#1: Striptang – vanaf groep 4**  
Klooi-koffer 1: de striptang  
In de koffer: Striptang  
Led's 3V knoopcelbatterijtjes  
Draad  
Werkboekje  
Op school en in de klas  
Wat kun je met deze koffer in het weekend? Grafisch

**#2: Lijmpistool – vanaf groep 3**  
Klooi-koffer 2: het lijmpistool  
In de koffer: Lijmpistool  
Lijmpatronen  
Oogjes  
Ander knutselspul  
Werkboekje  
Op school en in de klas  
Wat kun je met deze koffer in het weekend? Grafisch

**#3: Soldeerbout – vanaf groep 5**  
Klooi-koffer 3: de soldeerbout  
In de koffer: Soldeerbout en houder  
Soldeertin  
IJzerdraad  
Tang  
Werkboekje  
Op school en in de klas  
Wat kun je met deze koffer in het weekend? Grafisch

Figure 11: Klooi-koffers (from Klooi-koffers, 2020)

## 2. Explorations

### Make.Do

Make.Do (2020) is a construction toy set with plastic screws and several tools to make things out of cardboard. Through the Make.Do Hub, the Make.Do company also has an online platform where parents and teachers can share what their kids (or the parents themselves) made. Here Make.do also shares instructions. These images, such as the one shown in figure 12, are interesting as they give only abstract drawings of what should be made, leaving room for the kids' own interpretation and creativity.

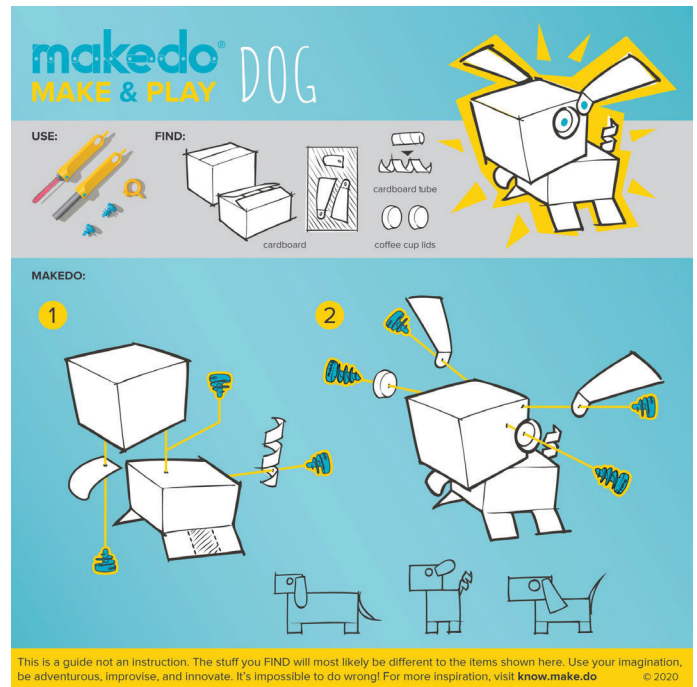


Figure 12: Make.Do instruction (from Make.Do, 2021)



Figure 13: Kids using Make.Do tools and a Make.Do toolbox (from Make.Do, 2021)

## 2. Explorations

### Lego Education

Lego Education (2020) offers Lego sets with an online database of lesson plans for teachers and parents. These lesson plans give step-by-step instructions, sometimes with a story, to give children a design problem to solve. The lesson plans are developed for use in schools, clearly mentioning how much time is needed for each step and for what grade the challenge is intended, and offering a structured approach to what skills will be learned, how to discuss the topic, and giving building tips and assessment opportunities.

The screenshot shows the Lego Education website interface. At the top, there is a navigation bar with the 'LEGO education' logo on the left and 'DISCOVER', 'SHOP', and 'RESOURCES' dropdown menus in the center. On the right side of the navigation bar are icons for search, a US flag, a user profile, and a shopping cart. Below the navigation bar is a blue header with '<< UNIT PLAN: INVENTION SQUAD' on the left and '< LESSON 5 OF 6 >' on the right. A secondary navigation bar contains links for 'Lesson plan', 'Ignite a Discussion', 'Building Tips', 'Coding Tips', 'Differentiation', 'Assessment Opportunities', 'Language Arts Extension', and 'Career Links'. The main content area features the title 'SPIKE™ Prime Set' in green, followed by the large heading 'Design for Someone'. Below the heading are 'Print' and 'Share' icons. A descriptive sentence reads: 'Use the complete design process to solve a real-world problem linked to prostheses.' Below this, there are icons and text indicating '120+ min.', 'Intermed.', and 'Grades 6-8'. On the right side of the page, there is a photograph of a hand holding a colorful, custom-built prosthetic arm made from Lego bricks. At the bottom right, there is a blue box titled 'Teacher Support' which contains two expandable sections: 'Key objectives' and 'Things you will need', each with a downward-pointing chevron icon.

Figure 14: Lego Education Online Lesson Plan (from Lego Education, 2020)

## 2. Explorations

### Your Turn - Co-design with kids

Your Turn was initiated by researchers from TU Delft to publish results from the research project ‘Co-design with kids – early acquisition of 21st century skills’ (Your Turn - Co-Design with kids, 2018). It specifically aims to teach the design skills described earlier in this chapter. The tool does so by offering variety of tools for Co-design projects with children that can be used in classroom settings. These tools inform the people who organise the use of the tool, provide step-by-step guidance and come with example worksheets for participants (Your Turn - Co-Design with kids, 2018).

### How are these skills acquired?

All these products have different ways of trying to help the kids to acquire design (related) skills. However, all these approaches, I believe, are all based on the principle that through exploration, the children

practise critical thinking and put these skills into practice to develop them. Each product has specific elements I found interesting to use as inspiration for using in SRI’s context.

Klooioffers gives kids tools to freely explore with, and gives them ‘real’ tools to work with.

Make.Do makes clever use of something that is available in abundance in many western countries; cardboard. Additionally it offers examples that allow for creative inspiration, but do not directly instruct.

Lego Education gives facilitators a well-organised lesson plan with clear instructions and sometimes stories or videos to make the problem relatable and gamify the design process.

Finally, Your Turn aims to teach children specific design skills by having them work on real design problems with design methods, in a structured way.

Co-design with kids toolkit - Experience gatherer



# EXPERIENCE GATHERER

Map and reflect on your own experiences in a playful and creative way.

-  **Participants**  
Individual
-  **Design skill**  
Develop empathy
-  **Prior design experience**  
None
-  **Duration**  
70 minutes
-  **Design step**  
Exploring the problem



Figure 15: An example of a Your Turn tool; Experience Gatherer (from Your Turn - Co-Design with kids, 2018)

# 2.7 Co-exploration activities

## Method

As explained in chapter 2.2 ‘Questions and Approach’, in the first half of the project, we organised four activities for children at SRI’s community centre. Through these activities I aimed to get to know the context, but also get insights into how I could ask the kids to design toys and teach them design skills. The activities organised in this stage of the project were all based on the design programme Your Turn - Co-Design with kids (2018). Prior to each activity, I prepared a ‘facilitatory guide’ for the facilitator, that aimed to give him all the information necessary to organise an activity at SRI’s community centre. These guides explained the goal of that activity, and added information explaining the underlying design principles or methodology for him. Finally they contained step by step directions for the different preparations the facilitator should make (e.g. printing assignment sheets or gathering materials).

The facilitator and I would select a date together on which he would organise a workshop for the kids. A few days ahead of the activity, I would send over the materials to the mediator at SRI via WhatsApp. Prior to hosting the activity, the mediator had the opportunity to ask questions about the materials or the activity. He would then proceed to recruit children by asking if they wanted to join the activity at the community centre in a couple of days. After the activity the mediator sent the videos and photos he took of the session, as well the results of the kids’ work, such as completed assignment sheets or prototypes, which I then analysed.

## Who participated?

At the start of the project only a limited number of people were able to come to the community centre on most days due to the pandemic, but a few children were still allowed to be at the community centre. In the later stages, COVID-19 regulations were loosened and more people were allowed to be at the community centre at the same time. The children that participated all lived in Okana, and sometimes already came to the community centre on their own. The children that participated were all in the primary school age category (6 to 12 years old).

## Why this approach?

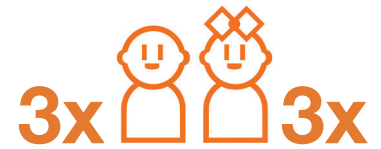
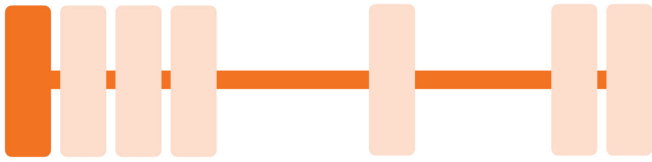
This research format also allowed me to quickly mediate problems and adapt the assignments to the findings, shaping the requirements for the final design that would come from this project. I got insights into which instructions for the facilitator were successful and which were not by reflecting and evaluating on that aspect together with him. By doing so iteratively, we were able to design all our roles more effectively.

Through the assignments, a first group of kids became acquainted with design and practised design skills by being introduced to the design process. These activities gave insight into how the children develop these skills, but just as importantly showed what the children find fun and motivating, and what they do not. What elicits a reaction and what does not? What do they like to build and what materials are available in Okana?



Figure 16: Overview of the activities we organised in three different stages of the project

## 2. Explorations



### Activity 1: Gathering Experiences

In this activity the kids received booklets with several questions with a request to draw their answers.

This specific activity was based on the Your Turn activity ‘Experience Gatherer’ (Your Turn - Co-Design with kids, 2018). Six children, three boys and three girls in the primary school age category took part in the activity at the community centre.

#### Goal of this assignment

This assignment aimed to help the kids develop their empathy skills. In the booklet the kids are asked to draw out their own experiences and compare them with the experiences of the other participants. They develop an understanding of the differences between people, their experiences and their view of the world around them.

The facilitator and I explored the effectiveness of this specific medium to give the kids a fun activity to do. The questions were also designed so that I could use the kids’ answers to get a better understanding of the kids’ lived experience, families, and surroundings.

#### The booklet

In the booklet the kids were introduced to the project, and shown an example of how they could draw out their answers to the questions. They were asked about four different topics: you and your family, today’s activities, playing with friends, and your toys. In each of these sections they were asked questions to which they had to draw the answers. Finally they were asked discuss with one of the other kids what the similarities and differences between their lives were.

#### The activity

The facilitator printed a booklet for each kid and prepared pencils and pens.

After reading the booklet and doing the assignments, the kids discussed the results and compared their experiences.



Figure 17: Boys working on the booklet



Figure 18: Girl working on the booklet

## 2. Explorations

### Takeaways Activity 1

1. Three girls and three boys ranged from age seven to thirteen participated in this activity. From the drawings it was evident that the children were in different stages of their development; the older kids drew more elaborate things in greater detail.

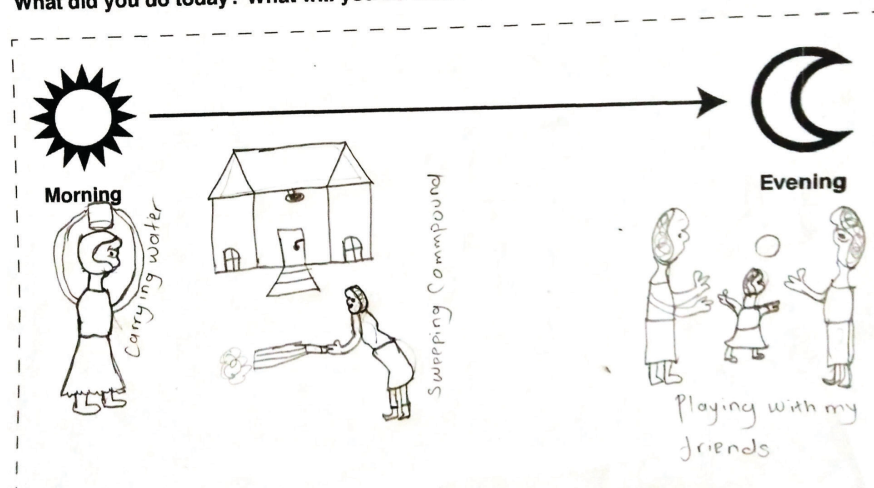
2. I asked the kids to join for the duration of the entire project, but the kids do not plan ahead that far. It is important that the design is flexible and fun. The kids will come to SRI whenever it suits them.

3. The activity was too school-like to really be perceived as fun by the children.

4. SRI does not have stationery for the children to use, nor the funds to buy them. Costs that had to be made to organise this assignment, such as printing the assignment sheets, and sharing the videos and results over the internet were significant investments for SRI.

### Today's activities

What did you do today? What will you do later? Draw the activities from left to right!



Who are you and who are your family members? Can you draw them and explain!



Figure 19: Selection of the results from the booklet



## 2. Explorations



### Activity 2: Pressure Cooker

This activity aimed to have kids do a design process 'pressure cooker'. In a short amount of time, in this case an afternoon, the kids go through a design process to design a ball game for indoors. This activity was supported by several tools from Your Turn: 'Empathic Design Challenge', 'Combine and Fantasise', and 'Making a choice' (Your Turn - Co-Design with kids, 2018).

#### Goal of this assignment

Through this assignment I aimed to see if this was a suitable way to get the children started with designing their toys, helped by the tools from Your Turn. To improve the facilitatory guide in comparison to the first activity, the explanation of the underlying design theory was more elaborate and visual. This was done to introduce the facilitator to the considerations that went into the design of the step by step guide for this activity that followed it.

#### The activity

The facilitator had to prepare the printed materials, and cut out the word cards for the kids to use during the activity.

#### The supporting materials

In the activity, the children were introduced to a character through a short story about football. In this story the main character wants the children's help with designing an activity like football, but that can be practised indoors in contrast to football. The subject matter of the activity was based on the finding that most children drew football as their 'favourite memory of playing with friends'. In the activity the kids first explore and formulate the problem for the activity, based on the Empathic Design Challenge, then come up with ideas based on the Combine and Fantasise tool, make choice by using the 'making a choice' tool, to finally prototype their idea, i.e. test their game.

### Takeaways Activity 2

Only two girls showed up. A reason for this might be that the facilitator organises the sessions whenever it best suited that week in relation to other activities at SRI, meaning that not all children could come again. However it is likely that using this school-like approach made the children lose interest after the first activity week already.

The facilitator explained the first step to the kids, but it was not easy for them to understand what was expected of them. Also, the girls weren't interested in the subject matter of the activity; football. The subject was chosen because it was drawn by the majority of the kids participating in the first activity as their favourite memory of playing with friends.

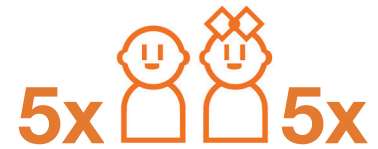
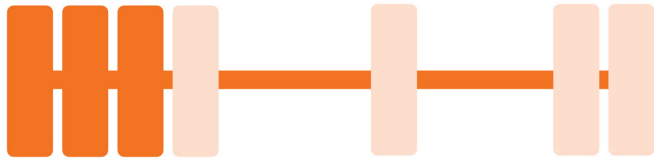
Instead of doing the workshop, they gave the sheets that went with the first step to the girls to take home. We never heard from those sheets again. It turns out that doing more chore-like homework is generally not a favorite pastime for most kids.

Another factor that needs to be taken into account when organising activities is how limited the budget is for materials and the costs of hosting the children at SRI. Printing costs are a limiting factor.

Finally, it seems there was a lack of focus. Too many new things were introduced at the same time that required active involvement from the facilitator. For both the facilitator and kids, this concentration of activities in one afternoon was too high. The school-like and over-structured approach would not work well with the children; they lost interest before we got to the building of the toy.

Also, for a facilitator with no prior knowledge about design, it is a lot take in all these new tools on top of the design process, and also organising an activity for the children all in such a short amount of time with a limited budget. The next activity thus had to be made more directive and concrete.

## 2. Explorations



### Activity 3: Empathy and Prototyping

For the third activity, I asked the children to ‘prototype’ a toy for one of the other participants with a material that is plentiful in the area and available for free: clay. Also, this activity’s facilitatory guide changed from a relatively dense and abstract explanation of the underlying design process into just a short introduction and then a step by step list of directions that the facilitator had to go through to host the activity. Additionally a list of questions was added that the facilitator should ask the children.

#### Goal of this activity

In this activity the children practised their empathy skills and by asking them to design a toy for one of their fellow designers. In parallel we investigated how we can have the children ‘prototype’ their design ideas at SRI effectively.

#### The supporting materials

In the facilitatory guide, I structured questions for each phase of the activity. Through those questions, I aimed to steer the children into coming up with a design to prototype in the second phase of the activity.

#### The activity

1. The first step is to make their assumptions clear; what do they think the other person would like to have as a toy and why? Then they investigate that by asking the ‘target user’, comparing their assumptions to what their target users reply.
2. After having found what the other kid would like, with the available materials (clay and whatever else is around) the children make a prototype of the toy.
3. Finally they give the prototype to the person they designed it for and ask what they think of it. Based on their answers, what could be improved and how? What materials do I need to make those improvements?

### Takeaways Activity 3

Five boys and five girls took part in the activity. Originally, there was another phase in which the children tested their prototype. Because of that, the last part of the assignment was made into its own activity for the following week (Activity 4), focusing on a form of giving feedback as part of a user test.

Although the children all seemed to have enjoyed Assignment 3, it was difficult to get an insight into their process and their reflections and evaluations of their design and process. As the facilitator had no prior design knowledge, he might not have taken note of specific parts of the process in the same way a designer would have.

For the young children, the questions that were meant to help them come to a design were too complex and had to be translated by the facilitator. The toys that were created were all representations of things in the children’s surroundings: animals, cars, humans, furniture. However, this might have been steered by the assignment, as well as the medium used; clay.

Some structure to reflect and act upon feedback is necessary to get children from the messing around in to critically thinking about their next steps.

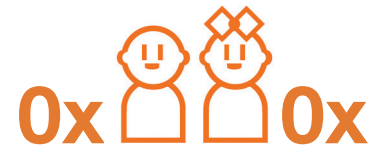
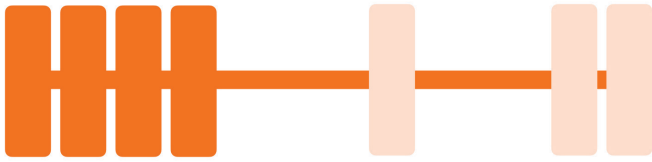
The number of children made it difficult for the facilitator to oversee their process.

## 2. Explorations



Figure 20: Impressions from Activity 3

## 2. Explorations



### Activity 4: Testing and Optimising

As the feedback giving phase was skipped in Activity 3, I designed a new activity in which the kids would improve their design based on the feedback their ‘target user’ would give them.

#### Goal of this assignment

Giving the children the tools to give valuable feedback to each other. By being able to do so the kids learn a valuable skill, but also make a plan for improving their design for their target user in the next activity.

#### The supporting materials

Despite the costs of printing, I sent a ‘feedback report’ sheet along with the facilitatory guide, because all interactions were mediated by the facilitator, and it would otherwise be almost impossible to get a proper insight into the process of giving feedback of the kids. This feedback moment was based on Your Turn tool ‘Forward with Feedback’ (Your Turn - Co-Design with kids, 2018). Additionally, it contained a swahili translation of the same format, which was not used in the end.

#### The activity

The children present their designs to each other and then both fill in the sheet and give feedback by following the steps. After discussing how to improve the design, the children can use the back of the sheet to draw and come up with how to improve the design for their target user:

- How can I improve the toy for my target user?
- What materials and tools do I need to do that?
- Whose help do I need to do that it?

#### Takeaways Activity 4

Due to the circumstances at SRI, we decided to skip this activity as it proved to be too difficult to organise at that time. Also, only planning the activity for next week based on feedback would not motivate the kids based on the insights from the previous activity. I came to the conclusion that it would be better to first design something more thoroughly that would give more structure to the kids’ design process, and guide the facilitator through the process.



Figure 21: SRI’s community centre as viewed from the road

# 2.8 Meta-analysis of activities

## Collaboration & Funding

Prior to the start of the project, it was discussed how a student project should take shape during the COVID-19. Spending time at SRI's community centre in Okana would be ideal. Since this wasn't possible, thus the only communication with SRI's stakeholders always was through an online tool either Zoom, but mostly WhatsApp. As a result, I couldn't go around talking to people, meeting them, or trying to get in touch with them in any more natural form. Thankfully, the facilitator I worked with, who became the intermediary of all the research, was often available and was extremely pro-active in recruiting kids, organising activities and communicating with me about the project.

During the setup of the collaboration, it was discussed that online video calling would be possible. During the process it became clear that finding a steady internet connection was hard to do at SRI, and there was really no budget for doing internet calls or printing.

## Interdependencies

SRI had the expectation I would provide the budget. What came to me as a surprise however, was the fact that SRI expected me to pay for the regular day-to-day operation costs of doing this project, such as the costs of calling over the internet. From SRI's perspective, being a non-profit organisation, largely dependent on donations and having a history with student projects that bring in the money, it can be easily understood. As a result of this, for several weeks my focus had to shift from the development of the toolkit, to finding the funds to even do the project in the first place.

To me, an important nuance was that SRI initiated the project, and we together shaped what would be done in the project. I took this as SRI truly wanting to offer children such an activity, rather than me imposing my desired project onto SRI's employees, volunteers, and the kids. But now it seemed SRI would have perhaps had more use from my project if I did something that would mainly bring in money, whatever the form. For

SRI these student projects are a good way to receive money. The subject matter of these projects, even when initiated by people from local organisations, has to please the western audience, because they provide the funding. Besides the family members of project members that might give some money to do the project, western institutions that give funding for these projects only do that on the condition that something either focuses on getting a working, independent business model, or reaches some sustainability goal which means that despite the best intentions, the project's result might actually not yield desirable or sustainable results for the involved organisation.

My main motivation is bringing something of value, something fun and inspiring to the kids who come to the community centre. But I also need, and want, to deliver (what we view here as) an interesting project result, i.e. a beautiful, attractive design, that shows cultural sensitivity to the context and makes sure the stakeholders can independently use it after finishing the project.

SRI understands the value of these projects for both sides. Communication towards the 'outside world' from SRI has to show independence from western institutions, as they aim to continue the relationship with institutions such as universities to bring in funding. Universities like to highlight that their students show social engagement through doing these projects. It is thus a complex symbiotic relationship, in which SRI is dependent on the students, but the students are also dependent on SRI, as they have committed to doing a project there. What led to my discomfort with having to be responsible for all the operational costs was mainly that it was not discussed beforehand, which resulted in that I suddenly had to find funds to even remain in contact with SRI. It came down to SRI saying: 'You can do something for us, and although we want you to do so, you also have to pay for all the costs we make in having you work for us'. Of course there is a clear economic difference

## 2. Explorations

between the two countries, and maybe because of that also a different culture around money. But because of this the focus of the project shifted to finding funding, rather than working on offerings the kids something fun and valuable to do.

I'm thus very grateful that, via my supervisors, the university paid for the costs that SRI had to make to keep the project going, as it allowed me to focus on offering the children something SRI and I agreed on was the reason and true value of this project. I think this pragmatic approach to being able to offer something of value to both sides is most effective, as to not lose too much time in a potential next project.

### Takeaways

An important factor for success for the project is thus that the knowledge is transferred in a way that ensures its extendability, ease of access, consideration for the amount of available funds and is adapted to the skills and experience of the local stakeholders, independent of western funding.

To convince the SRI staff of the value this project can bring, the goal of each step, and especially the end goal has to offer clear, tangible improvements for SRI, besides the more intangible long term benefits the children can gain from learning these skills.

A knowledge transfer would thus be preferable over raising money to build something that is then hardly used because the operation costs are too high (as happened to the elaborate plans for the woodworking facility). All the investments that need to be made at SRI for the final design to be used, need to be covered by this project to avoid delivering a design to SRI that can't be used after this project is finished.

# 2.9 Insights from explorations

In 2.1 ‘Defining the project scope’, I explained why a project aimed at knowledge transfer would be the most sustainable result for SRI, both financially and environmentally.

In 2.2 ‘Questions and Approach’, I showed that using an iterative approach helped to stay in touch with the people at SRI, gather insights, and develop those insights into new interventions. This has proven valuable and is further used to continuously iterate on the insights described next to design the final deliverable:

In 2.3 ‘Understanding the context and culture’: Using online materials and what I saw, heard, and discussed with SRI’s employees, gave an insight into SRI’s surroundings. Everyone who comes to SRI lives in close proximity of the community centre, and the kids come and go at SRI’s community centre. To be able to reach the kids and enthuse them for joining activities, it is valuable to make the subject matter relatable and interesting for both boys and girls.

In 2.4 ‘Understanding Play’, I have shown that free play is an important part of child development, but adults can also help to facilitate learning by structuring play. When play is fun and engaging, children develop a broad set of skills that build on each other, making it an effective form of learning. Although play itself is a universal phenomenon, what children play with is dictated by the context and surroundings; making the subject matter relatable is important.

In 2.5 ‘Understanding Toys’ I explored the three principles that need to be kept in mind to help to make toys fun: aimlessness, play value and empathy. Toys can be a motivating medium for kids to work with, as they are proud of their possessions. Making toys for themselves can be even better. This shows in East African countries where children often build their own toys out of what they can find, as is illustrated by the galimoto specifically.

In 2.6 ‘Playful Education of Design Skills’ I explored why design skills are valuable to teach to kids. They’re valuable for their wide applicability, but also because they help to learn how to learn; exploring, testing, discussing, and improving. The design process can act as a guide to structure that process.

Existing toys and educational programmes for kids all have different approaches with specific characteristics that might translate well to SRI’s context such as abstract suggestions to guide kids to certain outcomes, elaborate lesson plans with stories and challenges for kids, and having kids work on real design problems with design tools curated by adults.

In 2.7 ‘Co-Exploration Activities’ I found out how budget is an important consideration in everything that is designed. Things that are taken for granted here, might not be available at SRI, such as coloured pencils and other stationery. It is important to work with what we have got and to communicate that well with the facilitator. I realised that fun, and a quick understanding of what the activities entail are the most important factors for the kids to join the workshops, especially when design is still an abstract idea that they cannot easily place. The facilitator can play an active and dynamic role in the activities. By making the designed tools clear, the facilitator can develop the skills to offer the right facilitation to the children’s processes and adapt the activities to better suit the situation. Complexity and abstraction should only be slowly introduced to the kids and the facilitator. It is demotivating when they cannot get started with the activities because they do not know how to.

From 2.8 ‘Meta-Analysis Co-Research’, I realised that to make sure that SRI can still use the final design after the project is finished, I have to minimise the costs that are required to use it.

## 2. Explorations

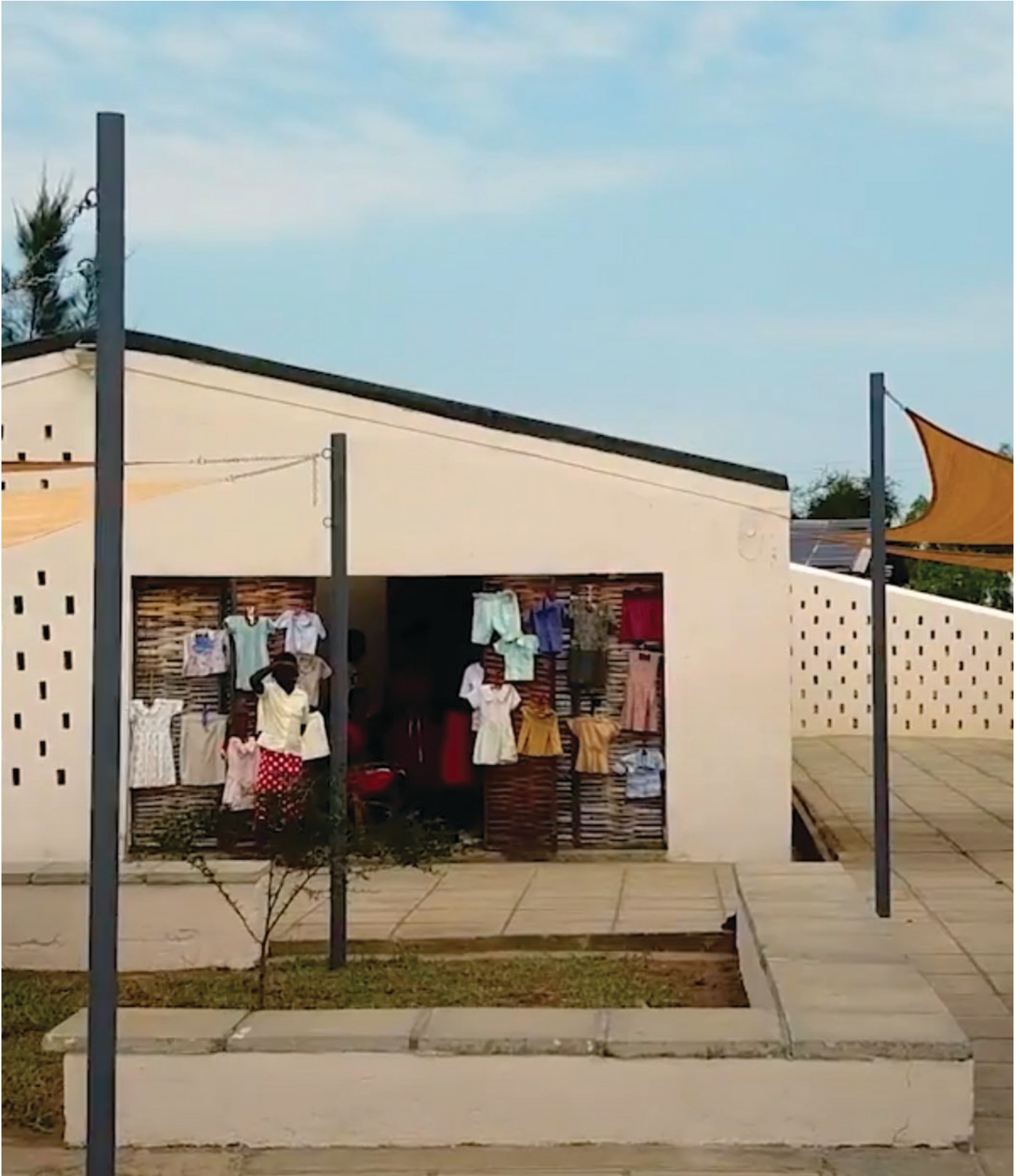


Figure 22: SRI's community centre as seen from the patio



# 3. Vision

**3.1 'Turning Insights into Goals'** describes how I translated the insights from my explorations to four pillars that served as the leading principles on which the concept was built and evaluated upon.



# 3.1 Turning Insights into Goals

Based on the findings described in section 2 'Explorations' I formulated the following four 'pillars' for the design. These pillars can be subdivided into two categories; two pillars mainly pertain to the content of the concept and its intended effects, while the other two are mainly concerned with feasibility and practical constraints of the context.

### Content

First of all, the concept should offer the children a fun experience. From the project's outset we had the intention to offer the children something fun, but it became clear from the research activities at SRI that fun is actually not just a side effect, but the primary motivation for the children to partake in the activities. That brings us to the second pillar: curiosity. By offering a fun activity through the concept, the children's curiosity should be piqued, and further inspired to develop the desired design skills. Adopting the design process and acquiring the skills through doing seems more effective than teaching them in a school-like way as in previous activities. Additionally, by reaching more children and getting them acquainted with SRI and the other activities they offer, the children can further develop other skills through SRI's offerings.

- Fun - Activities are fun and inspiring for the children, and the subject matter and results relatable
- Curiosity - Inspire the children to be explorative, empathetic, entrepreneurial and collaborative

### Context

From both the research activities and the collaboration with the facilitator to make the research activities happen, it became clear that clarity was important all throughout the project: in communication about the desired outcomes, but also in the concept itself and its contents. We need to find an effective balance between the level of directiveness and freedom in the activities. This is true for the materials aimed at the children and the ones aimed at the facilitators at SRI. Finally, SRI has limited funds to host the activities for the children, and pay for costs of e.g. materials and other necessities for the activities. This means that when possible, making costs and investments should be avoided, making use of what is already available there. The continuity of the final design should be constantly evaluated. The budget that became available towards the second half of the project could be invested in buying tools that remain in long term use at SRI, in addition to being used for the activities.

- Clarity - Clear steps and examples for the children and facilitators so they can empower the children to develop the desired design skills
- Continuity - Use locally available skills, tools and materials, and avoid expenditures that have to be made after this project ends to ensure the longevity of its results at SRI

### 3. Vision



Figure 23: Kids on the patio

# 4. Conceptualisation

In 4.1 'Ideation' I describe the process of going from the previous four abstract pillars into a Minimum Viable Product (MVP).

In 4.2 'MVP Overview' I describe what that MVP entails.

4.3 'MVP Evaluation' describes how the MVP was evaluated and the insights that evaluation yielded.



# 4.1 Ideation

## Method

In line with the research by design approach that was used from the start, to mould these abstract pillars into a format that would work, I designed a 'Minimum Viable Product' (MVP). By using this approach, I could explore how to make these abstract pillars tangible in the shape of a design. By doing so I could immediately test and evaluate how this specific solution was experienced by the two target users in reaching their respective goals: the facilitator in organising the design activity and the kids in designing a toy and practicing their design skills.

## Iterations

Based on what I designed during the exploration phase of the project, I assessed what worked and what did not work for the kids and the facilitator. I continued with the iterative approach and built on those ideas and the insights from the desk research that were done in parallel to those co-exploration activities.

## Minimum Viable Product

The MVP was a workshop that was hosted at SRI's community centre. The workshop contained five parts made up of a specific activity: An 'ice-breaker' activity, a video and discussion activity, a 'prototyping' activity, an interview and a final video to finish the session. The set up aimed to follow a structure that offered the kids a fun experience, but that at the

same time facilitated the learning experience of the children, helping them adopt the desired design skills by having them go through a short design process.

Three things were designed and delivered to SRI to help host the workshop: a guide for the workshop facilitator, a video that introduced the contents of the workshop and a video concluding the workshop.

## Workshop 1 'Let's design a toy car!'

In this workshop the children practise several design related skills, while showing them they can use material from their surroundings to turn one of their own ideas into something tangible. This is done by having children go through a design process in which they make a prototype of a toy car from locally available materials such as clay and twigs. Toy cars were chosen as subject, because they are present in the children's lives (and thus relatable), relatively simple to successfully model ('it has four wheels so it's a car'), exciting because they can move (the workshop helps them in making their cars able to move), and can be diverse in both use and appearance (leaving room for the kids own interpretation).

## Facilitatory Guide

In the facilitatory guide the workshop is explained step by step to help the SRI employees to successfully host the workshop. The guide can be found in Appendix 1.



Figure 24: Workshop 1's video outline

# 4.2 Minimum Viable Product (MVP)

## Overview

### Workshop Structure

#### 1. Introduction and Icebreaker

The icebreaker activity is aimed at getting the children warmed up for the design activity ahead. The children are asked several questions, both unrelated and related to the topic of the design activity. This is based on exercise 'Choose your side' from the your turn toolkit (Your Turn - Co-Design with kids, 2018). The facilitator suggested this activity to get the children excited to do the activity.

#### 2. Video and Discussion

The video contained most of the contents and information about the workshop, so that it can be reused, and facilitators only have to prepare prototyping materials at the community centre to repeat it in the future. The video introduces the topic to the children, asks them questions to discuss that help them come to a design. The children are given examples of how they can prototype their toy car with clay in the video. Clay is the material of choice because it is readily available around the community centre. The video is explained on page 42.

#### 3. Prototyping

Prototyping is the main activity of the workshop. Of all the phases this is the least structured one; giving the children the opportunity for (almost) free play. After collecting some clay outside, they make a prototype of the car based on the decisions influenced by the questions and discussions.

#### 4. Interview

In step four, I video called with the kids and the facilitator. In the conversation the kids presented their designs and we discussed the workshop.

#### 5. Conclusion

In the conclusion of the workshop, the kids are shown a video that congratulates them on finishing the design challenge and reinforces the skills they have practised and learned.

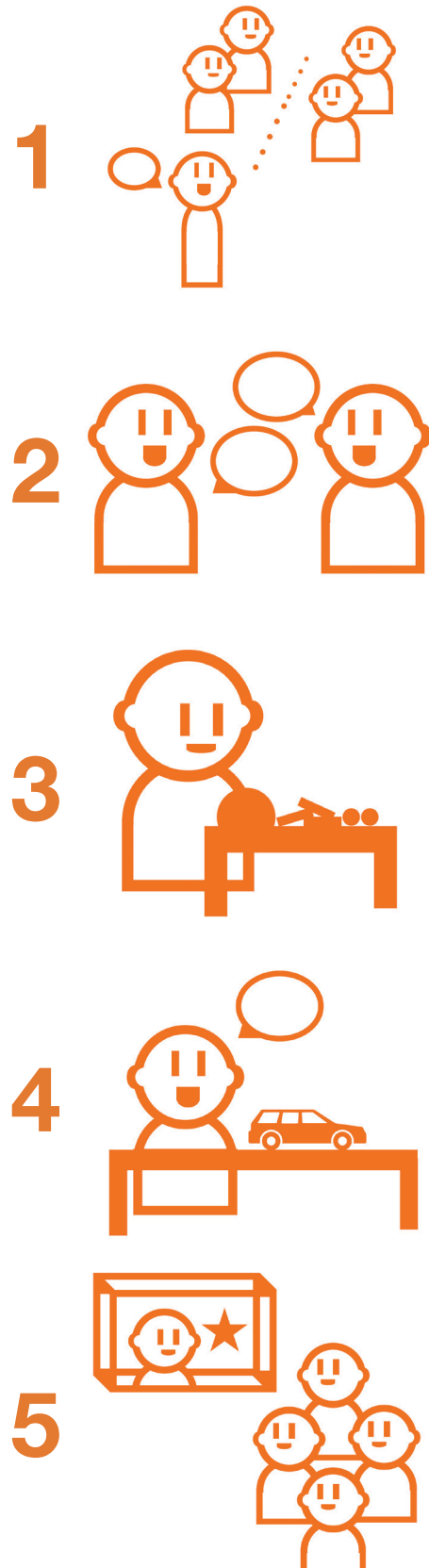


Figure 25: All phases of the MVP Workshop

## 4. Conceptualisation

### Workshop Video Overview

The video helps the facilitator to structure the workshop while at the same time introducing the children to the topic of designing car (the full storyboard can be found in Appendix 2). It opens with a shot showing a toy car made of clay, like the children will design in the later stage of the prototype. After that the video shows a 1:1 sculpting clay model of a car to illustrate how cars are designed. Then the introduction is concluded with an invitation to design a toy car. All the on-screen text is also read out loud.



Figure 26: Opening shot



Figure 27: Showing how cars are modeled

### Questions

The text on the orange background contains questions. By answering these questions the children start giving shape to their design by defining specific aspects. The following questions are asked in the video: 'What will the car you will design be used for?', 'What materials can you use to make a toy car?', 'What car parts can you think of?', and 'How can you make a toy car with clay, bottle caps and twigs?'

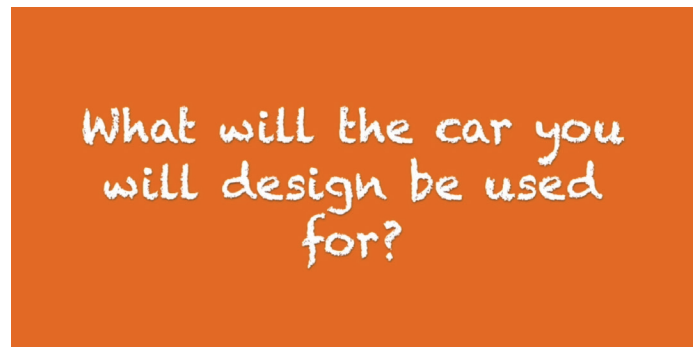


Figure 28: Question

### Discussion

This shot requests the facilitator to pause the video and to ask the children to discuss the question that was asked before. The facilitator can help by translating and explaining to help the children articulate their thoughts.

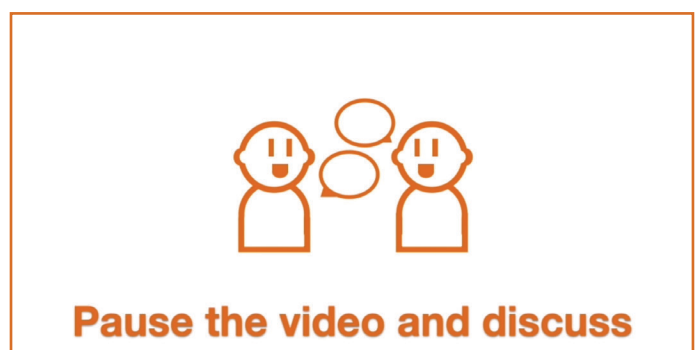


Figure 29: Pause and discuss

## 4. Conceptualisation

### Suggestion

Next, the orange text on a white background gives suggestions for outcomes of the discussion that was provoked by the previous question. These suggestions are given help the facilitator conclude the discussions and to not overwhelm both the kids and the facilitator with too many design decisions to make. Finally, it also allowed me to steer and predict the outcomes, as I would not be present to give guidance to the discussion myself.

### Examples of car parts

After the questions and discussions, the video presents some examples to show the children possible ways of making the car. I chose to do so because in the previous activities the level of abstraction proved difficult, and would help in finding a way to use the locally available materials.

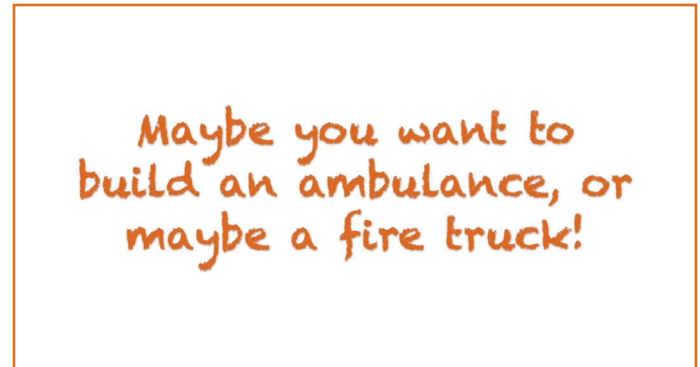


Figure 30: Suggestion

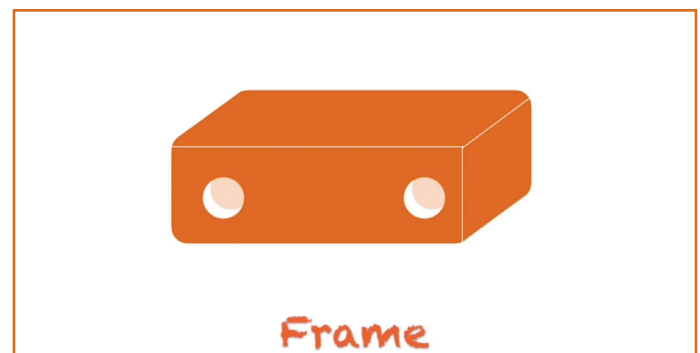


Figure 31: Introduction of example car part



Figure 32: Example car part being made



Figure 33: Putting the example parts together



## 4. Conceptualisation

### Conclusions Video Format

In the 'conclusions' video, the children are reminded of all the steps they took during the design process. The narration reads the on screen text that goes over each phase of the workshop. It summarises the step and then concludes with the specific skills the kids practised.



Figure 34: Opening

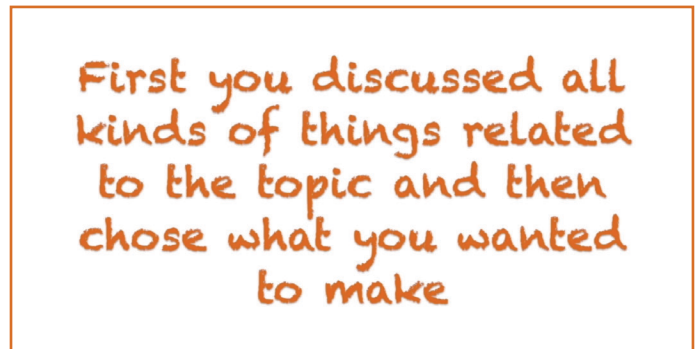


Figure 35: Questions



Figure 36: Learned Skill



Figure 37: Congratulations

## 4. Conceptualisation



# 4.3 MVP Evaluation

## General insights

To evaluate the MVP, the facilitator organised a workshop at SRI's community centre. Three boys wanted to participate in the activity and went through the workshop as described in the previous chapters. The four pillars for the design were:

1. Fun - Activities are fun and inspiring for the children, and the subject matter and results are relatable
2. Curiosity - Inspire the children to be explorative, empathetic, entrepreneurial and collaborative
3. Clarity - Clear steps and examples for the children and facilitators so they can empower the children to develop the desired design skills
4. Continuity - Use locally available skills, tools and materials, and avoid expenditures that have to be made after this project ends to ensure the longevity of its results at SRI

These abstract concepts were translated to the following questions to evaluate whether the MVP had the intended effect:

1. Are the children engaged in the experience offered by the workshop and enjoying it? Are the activities clear and fun?
2. Are they inspired by the activity and do they feel like they have learned from the activities? Are the design skills being transferred to the children? Are the children coming to SRI, are they being inspired to come more often and partake in other activities there or read, use the IT facilities, etc.
3. Are the videos clear: do the children understand the steps they should take and are these steps engaging? Are the facilitators able to effectively facilitate the project and empower the children's process? Is the language simple enough and clear? Are the graphics understandable?
4. Does the toolkit work in the context? Is it repeatable? Do they have the necessary skills now? Are there other things necessary before it can be properly hosted?

## Findings

The goal of this first workshop was, besides testing the suitability of this format itself, to evaluate the educational value of the design. Also, the aim was to teach this structured process for making something, with the goal to set in motion the realisation that they can use that approach to do something themselves.

It was hard to get kids to join as it was difficult to use the abstract idea of 'we'll design something' communicated to them. According to the facilitator, girls did not get involved because they were not interested in designing a toy car.

## Phase 1 Icebreaker

### Evaluation

The ice breaker activity seemed too unrelated to the workshop to the facilitator. He felt that he needed something to help him get the children interested in joining the workshop. However, once the children were willing to join the workshop, they were not interested in first doing the icebreaker. They wanted to get started with designing their toy car immediately.

### Action to take

A recruitment video would be more valuable for the facilitator and SRI, as it would allow them to involve children who are not already coming to the community centre, as well as motivate children who come by showing them why it is fun to join the activity.

## Phase 2 Video and Discussion

### Evaluation

According to the facilitator the video was clear. He played an active role in the workshop even when the video was playing by translating questions, further explaining them, and moderating the discussions. This seemed to have a positive effect, as the questions could be tailor-made for the situation.

## 4. Conceptualisation

### Action to take

A recruitment video would be more valuable for the facilitator and SRI, as it would allow them to involve children who are not already coming to the community centre, as well as motivate children who come by showing them why it is fun to join the activity.

### Phase 3 Prototyping

#### Evaluation

Using the clay and other local materials was immediately adopted by the children. The children all created different cars, with different goals and underlying reasons for building that specific car. Some children even came up with different parts than suggested in the video.

All the children only recreated cars that already existed. However, the goal of the workshop was getting the children to create something from nothing, which they did.

#### Action to take

In further workshops the kids will have to work towards more original designs, based on fewer examples, and thus use more of their problem-solving creativity instead of just their creativity pertaining to formgiving.



Figure 38: Making a toy car

### Phase 4 Interview

#### Evaluation

The interview with the children was fun for the children, and although it was chaotic, it gave a beautiful insight into the way the workshop was hosted, the children's work and considerations during the workshop.

It was clear the children enjoyed the video call itself, but also were evidently proud of their cars. Upon asking the children came up with, or mentioned they already had thought about plans for improving their cars. They named parts they wanted to make, and what materials they would use for those parts.

As the video call continued, more children came to see what was going on, and thus a racket was raised by the kids, but the kids also showed some interest in what the partakers had built.

#### Action to take

This part should be changed into an activity where an outsider is not involved in this form, so the workshop can be held at SRI independently, thus turning this interview moment into a presentation moment to conclude the activity with the children. Instead of me taking on the role of interviewer, the children will ask questions and give feedback on each other's designs and prototypes, but also celebrate the finishing of the workshop.



Figure 39: Getting there

## 4. Conceptualisation

### Phase 5 Conclusion

#### Evaluation

The concluding video aimed to make the children aware of the steps they went through, and what design skills they practised during every step of the workshop. Although the facilitator thought it was clear to the children, upon asking for further clarification he admitted that it required quite some clarification from his side. In short, although he confirmed it was useful to reiterate the skills they had practised, the video was too abstract.

#### Action to take

Use the video (with the necessary changes) that was now the introductory video as a tool to help the facilitator become aware of the skills the children practise and develop during each step, with questions he can ask to help the children better design and think about their designs.

Additionally, making the final video focus on one of the most prominently used skills in the activity and telling it from the perspective of the kids might help the children to realise their learning and internalise it.



Figure 40: Further taking shape



Figure 41: Wheels being made



Figure 42: Putting the axis through



Figure 43: Ready to roll

#### 4. Conceptualisation



Figure 44: Proud car designers showing off the fruits of their labour

# 5. Final Concept

In 5.1 'SRI Workshop Toolkit' I describe how the final iteration of the design came to be and introduce the toolkit and its contents.

5.2 'Organising Design Workshops' describes the format that is used for the workshops, why it follows that format and what skills it teaches the kids.

5.3 'Facilitator Manual' gives an overview of the manual and how it aims to help the facilitator .

5.4 'Supporting Videos' summarises the contents of the videos and the design decisions that went into making them.

5.5 'Challenge Sheets' shows the challenge sheets and the design decisions that went into making them.



# 5.1 SRI Workshop Toolkit

## Final Iteration

Based on the evaluation of the test, I further improved and expanded upon the MVP to create the final design. The MVP test validated the workshop as a viable medium to offer the children a fun experience in which they could also practise design skills. For the kids to further practise these skills, they would need more activities. The concept expands on the MVP, making a holistic toolkit that SRI can use to host workshops for children at the community centre, offering the kids a fun and educational experience.

## Introducing the toolkit

The toolkit contains all the necessary tools to host workshops for the children. These workshops focus on teaching the children how to use a structured approach to ‘build something from scratch’, and help them to

develop design skills through the design activities in the workshops. The children work on increasingly more complex design challenges. In these workshops, the children are introduced to a topic, and then challenged to design something or to solve a ‘problem’ related to that topic. These challenges are designed around creating physical models of solutions, mainly with the clay that is abundantly available around SRI’s community centre, although later challenges are suggested with other materials. The first workshop is the same as in the MVP; designing a toy car. The second workshop further expands the solution space of the design challenge, and has the children prototype a building to solve a problem of their choosing in their own village. The further workshops are open to the facilitator to interpret.

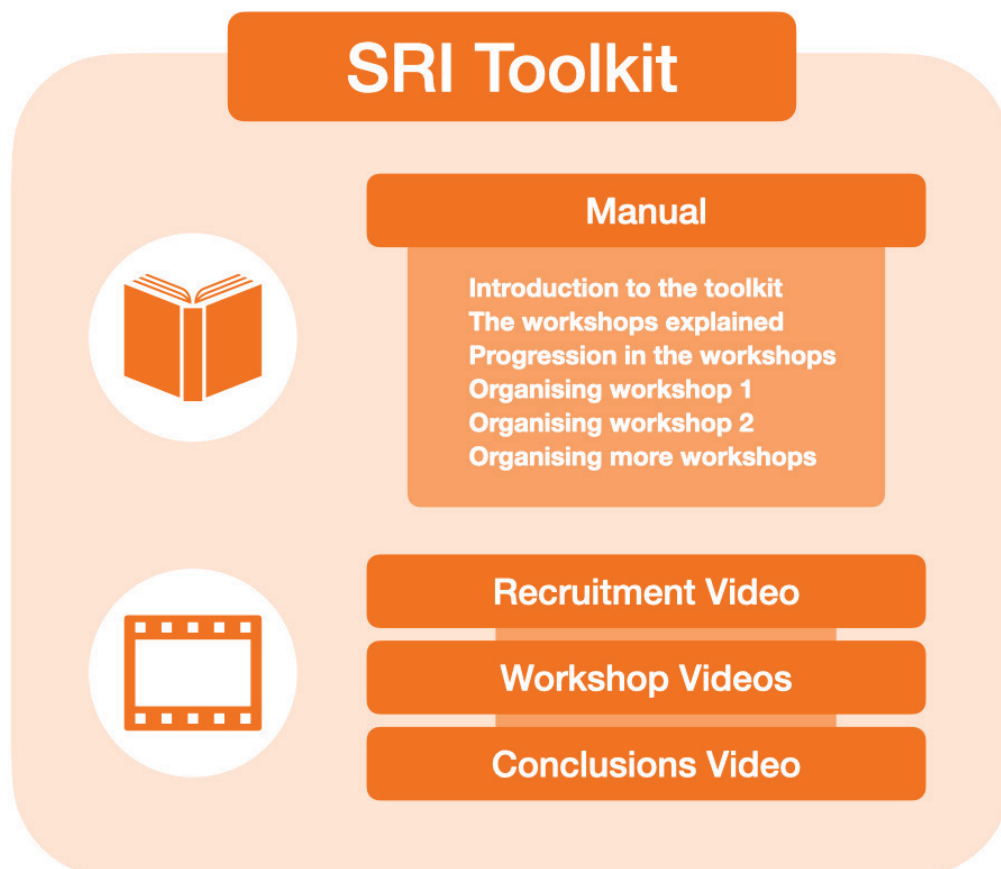


Figure 45: SRI Toolkit

## 5.2 Organising Design Workshops

### Workshop Outline

The workshops are always organised in the same three phase structure. The three phases, 'Exploring the topic and defining your goal', 'building and testing your idea', and 'presenting your design', are based on the typical design processes as described in chapter 2.5.

This is done to help both the children and the facilitator get acquainted with the design process, that they can then later make their own. Each part of the design enables the children to practise a specific set of design skills, similar to what is described in chapter 2.5.

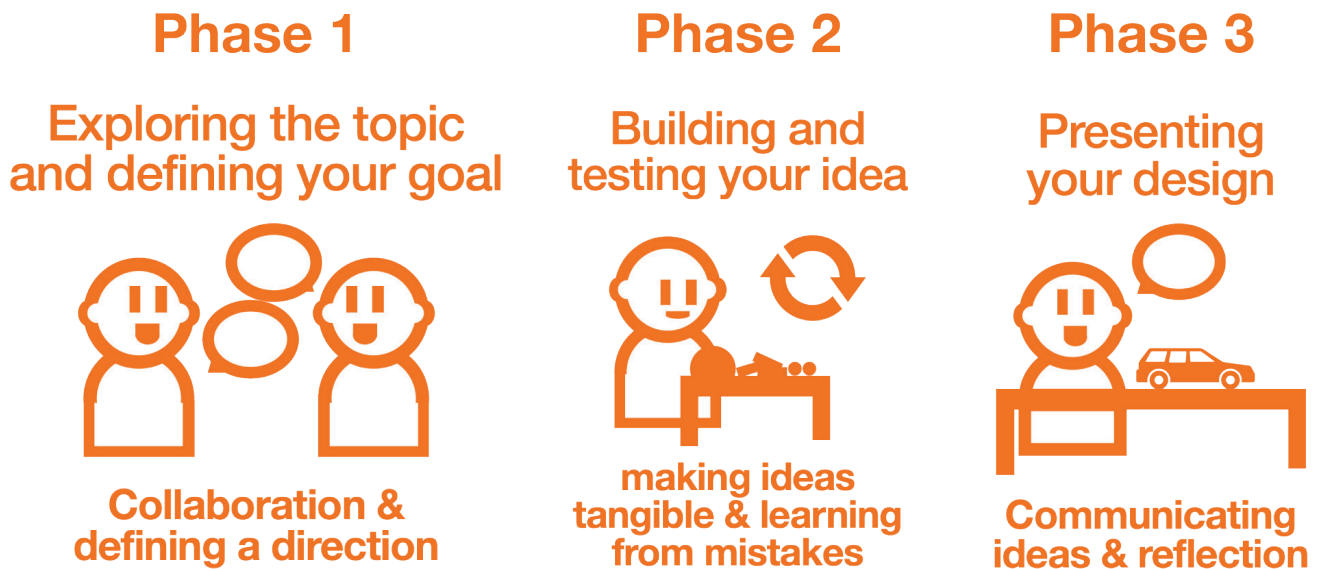


Figure 46: The design workshop's three phase structure and the skills practised in each phase



# 5.3 Facilitator Manual

## General Overview

The toolkit's main tool is the manual, through which the facilitator is given the necessary information to organise the workshops in an effective and fun way. Subsequently, the underlying educational background of the project, and the information about the design skills the workshops aim to teach are explained. To help the facilitator organise the first two workshops, step-by-step guides are included. The toolkit includes two videos that structure the workshop by introducing the topic, a challenge, questions that help the kids discuss and define what they will design to solve the challenge.

The workshops increase in complexity by offering the children fewer examples, less directive steps and a bigger solution space with each workshop. The same is true for the workshop facilitator, who has to play a more active role in facilitating discussions, the prototyping phase, and presentation phase of the workshops. After the first two workshops, the manual offers suggestions to the facilitator for organising more workshops in the shape of 'challenge sheets'. These sheets give a narrative and questions for the facilitator to mould into the next challenges for the workshops.

## Table of contents

1. Introduction to the toolkit
2. The workshops explained
3. Progression in the workshops
4. Organising workshop 1 (design a toy car)
5. Organising workshop 2 (design a building)
6. Organising more workshops (challenge sheets)

The manual can be found in its entirety in Appendix 3.

## Organising Workshop 1 and 2

To help the facilitator organise workshop 1 and 2, the manual contains facilitator guides with step-by-step instructions for each phase and several suggestions for questions to better mediate the discussions during the activities. The guides have not changed in contents in comparison to the MVP, but they have taken a different shape, as can be seen in Appendix 3.



Figure 47: Decrease of directiveness and increase in solution space visualised.

## 5.4 Supporting Videos

### General Overview

The toolkit provides the facilitator with several videos for the different stages of organising the workshops. First he can use one of the two recruitment videos to get the kids excited to join the activity at SRI. The first of these two recruitment videos is detailed on the right half of this page.

The workshop videos help him to organise the first two workshops. The video for the first workshop, which is the same as the one used for the MVP is directive and gives the children specific examples to base their work.

The second workshop video further opens up the ‘solution space’ for the children, and is detailed on page 54.

Finally, the ‘Conclusions video’, as described on page 44, helps the facilitator to remind what they did and learned during the activity.

### Recruitment Video

The recruitment videos (the full storyboards can be found in Appendix 4) quickly introduce the workshops to the children. By making use of the footage from the earlier workshop, it makes the activity visible to the kids, because otherwise ‘designing a toy car’ or ‘designing a building’ remains very abstract for the kids. It does not only show the results, but also shows the other kids that joined to give an idea of the atmosphere.

### Workshop 1

Workshop 1’s video remains the same as the one that was used in the MVP. Based on that video and the principles of ‘directiveness’ and solution space explained on page 52, the video supporting workshop 2 is explained on page 54.

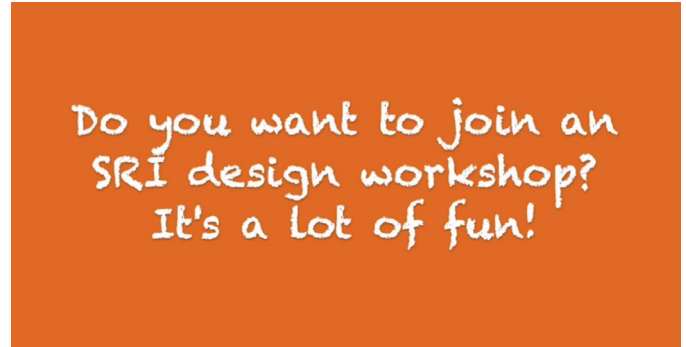


Figure 48: Recruitment Video Opening



Figure 49: Recruitment Video Explanation



Figure 50: Recruitment Video Footage



Figure 51: Recruitment Video’s Festive Ending

## 5. Final Concept

### Workshop 2

Workshop 2 is supported by the video that further decreases the directiveness in the questions it asks. It also leaves a bigger solution space for the kids to design in. It does not only ask the children how to solve a design challenge, but also what problem they want to solve and how they will do that. The video follows the same structure as the first, but leaves out the examples that help the kids solve the design challenge. The following questions are asked in the video: ‘What kinds of buildings can you think of?’, ‘What kind of building would you like to build in your village and why?’, ‘Who are going to be using the building?’, and ‘How will you design the building so that people can use it as intended?’

The full storyboard for the video supporting workshop 2 can be found in Appendix 5.



Figure 54: Visual introduction

What kind of building  
would you like to  
build in your village  
and why?

Figure 55: Question to define the design goal



Figure 52: Opening



**Pause the video and discuss**

Figure 56: Discussion moment

When designing  
buildings, people  
sometimes also use  
clay to come up with  
ideas and to show  
them to others

Figure 53: Introduction

Last time I gave you  
some examples, but  
this time you have to  
decide how you will  
make your prototype

Figure 57: Increasing the difficulty

# 5.5 Challenge Sheets

## Challenge sheet overview

As the facilitator becomes more acquainted with the format, the materials get less directive. After the first two workshops, he has to fulfill the role the videos performed in the first two workshops. It will thus be up to them to introduce the topic and steer the children's discussions. To help the facilitator do so, there are four 'challenge sheets', that can be found on page 14 -17 of the manual (Appendix 3).

Before that there is an instruction that explains how to use the challenge sheets for organising the next workshops. Each sheet offers the facilitator a topic with a related challenge, suggesting a story to explain the challenge to the children and involve them in the workshop. Finally it gives several practical suggestions for organising that specific workshop.

## Challenge sheets

On page 56 the instruction page and the challenge sheet that are meant to help the facilitator organise further workshops are shown. The first sheet explains how to use the challenge sheets, like the one below the instruction.

The manual has two more challenge sheets with concrete suggestions for workshops. On page 57 you can find the final challenge sheet, that helps the facilitator come up with topics and stories for the workshops himself.

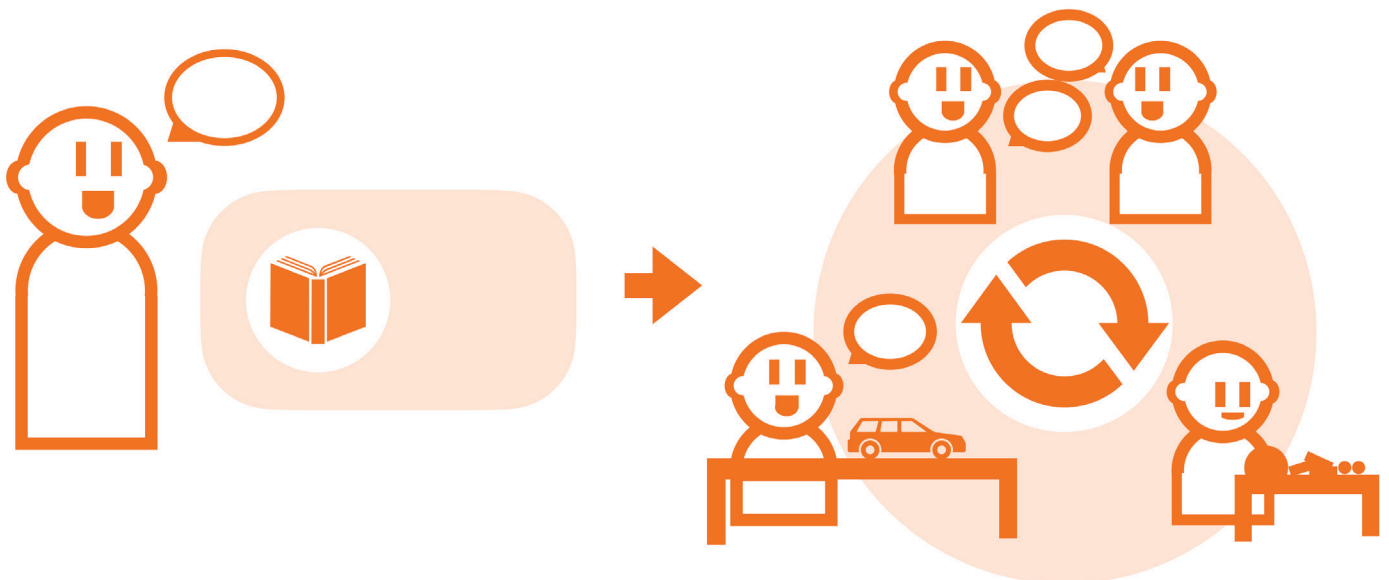


Figure 58: The manual gives the facilitator the tools to come up with more workshops for the kids

# Coming up with more design activities

Instruction



**1 Story & Discussion**

Tell the kids a story to help them understand and then discuss the problem.

**2 Prototyping**

Ask the children to build a prototype to solve the problem in the story.

**3 Presentation & Test**

Ask the children to present their solution for the problem in the story. Then allow them to ask questions and give feedback to each other. Some challenge suggestions also have a competitive element. You can use this moment to see who has won.

**C**  
Character

Every challenge sheet introduces a character with a wish, that runs into a problem that hinders them from reaching their goal.

**P**  
Problem

The challenge sheets give suggestions for these three story elements for you to turn into a story for the children. You can elaborate or change the story as you see fit. By introducing the challenge in this story structure, you help the children imagine what they need to consider when they are coming up with a solution.

**G**  
Goal

After telling the story, you can help them to do so by helping them to specify: what, where, when, who, and how.

**Suggestions**

The challenge sheets also give suggestions for how you could organise the activities, or in what direction you could steer the kids' solutions.

Figure 59: The manual first presents an instruction of how to use the challenge sheets

# Workshop 3: Who can build the safest bridge?

Competition



**Preparation**

Prepare two bricks or stones to act as river banks for the children to build their bridge across.

**Story**

Use the suggestions to create a story for the challenge. You could also make the story about having to cross the 'river' with their toy car.

**Prototyping**

Give the children the chance to collect materials and ask them to prototype their solution for the problem in the story.

**Presentation**

Ask the children to present and test their way of getting across the 'river' one by one. Give them the opportunity to give feedback to each other.

**Options**

You could challenge the kids: who can build the best bridge?  
or  
Give an open-ended story: in what way can you cross the river?

**C** A girl is walking to the next village with her new shoes on

**P** There is a river but she wants to keep her shoes dry

**G** Help her get across the river without getting her shoes wet

**Suggestions**

You can use two big bricks to act as the river banks for the kids to build a bridge across. Additionally, you could use something as a weight to test if the bridge is 'strong enough' to support their toy car.



Figure 60: The challenge sheet for organising workshop 3

## 5. Final Concept

# Organising more workshops: How can we ... ?



Figure 61: The final challenge sheet aims to help the facilitator to organise more workshops by himself in the future

# 6. Evaluation

Chapter 6.1 'Approach to Evaluation' explains the approach we took to evaluate the toolkit.

Chapter 6.2 summarises the evaluation and the findings from the workshop on the basis of the second video and the step-by-step guide in the manual.

Chapter 6.3 summarises the evaluation and findings from the workshop that was based on the manual's example sheets.

In Chapter 6.4 'Evaluation with stakeholders', I discuss the insights from the closing interview with the SRI staff.

In Chapter 6.5 'Evaluating on the four pillars' I compare the insights from the evaluative studies to the goals formulated as the four 'pillars' for the design, as described in chapter 3.1.

Finally, in Chapter 6.6 'Design recommendations', I suggest further steps for improvement of the design.



# 6.1 Approach to Evaluation

We organised two workshops to evaluate the format of the workshop itself, the manual, the supporting video and the challenge sheets. The facilitator first organised a workshop with the help of a video (Workshop 2 of the concept), and a workshop based on the example sheets (Workshop 3 of the concept).

## Overview

To evaluate the final design, the facilitator and I organised two workshops. The facilitator hosted the first of these two workshops based on the step-by-step guide (Workshop 2 of the concept, Appendix 6) and video (Appendix 5).

The facilitator organised the second of these two evaluation workshops on the basis of the challenge sheets in the manual (Workshop 3 of the concept, Appendix 3).

We wanted to know whether the facilitator could independently organise the workshops based on the materials alone. The materials underwent a ‘baptism of fire’, as he organised the two workshops to evaluate whether he could in fact independently organise the workshops with them. After these workshops, I could directly ask the facilitator about his own opinions, but I could not ‘observe’ him while he was hosting the workshops.

Because of the limitations of the project, mainly the volatile internet connection, I could not be present over a live connection to evaluate the workshops as they happened or actively participate in the workshop. This meant that the workshops could only be evaluated indirectly and that the facilitator would be the intermediary between the kids and me. The children’s perspective on the workshops was indirectly measured by their willingness to participate and join the next workshop. Finally the facilitator and I held a short interview after the workshops with several of the kids that participated in both workshops. In this way, we were still able to measure the effectivity of the toolkit and the manual.

## Evaluating design elements

Through organising these two workshops I also aimed to evaluate specific design elements. The design elements that were evaluated in each workshop are summarised at the start of each chapter pertaining to the evaluation of the workshop.

## Overall measures for evaluation

The design needs to comply to the four pillars that lead to the creation of this specific design:

1. Fun - Activities are fun and inspiring for the children, and the subject matter and results relatable
2. Curiosity - Inspire the children to be ‘designerly’: explorative, empathetic, entrepreneurial and collaborative
3. Clarity - Clear steps and examples for the children and facilitators so they can empower the children to develop the desired designerly skills
4. Continuity - Use of locally available skills, tools and materials, no expenditures after my project ends to ensure extendability

I used questions based on these four pillars to evaluate the final design:

1. Are the children engaged in the activity provided by the workshop? Do they enjoy it? Are the activities clear and fun?
2. Are they inspired by the activity, do they feel like they have learned from the activities? Are the design skills being transferred to the children? Are the children coming to SRI?
3. Are the facilitators able to organise the workshops and empower the children’s process? Are the instructions clear? Do the children understand the steps they should take? Are the graphics understandable?
4. Does the toolkit work in the context? Is it repeatable? Do the children have the necessary skills now? Are there other things necessary before another workshop can be properly hosted in the future?



## Workshop 2: supported by a video

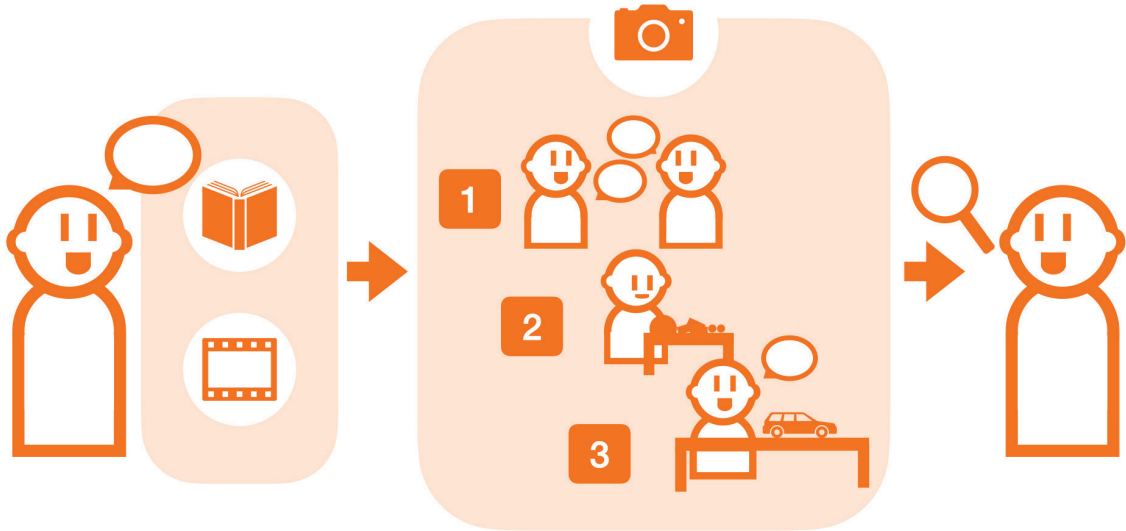


Figure 62: We organised a workshop to test the final workshop format and the supporting video

## Workshop 3: based on an example sheet

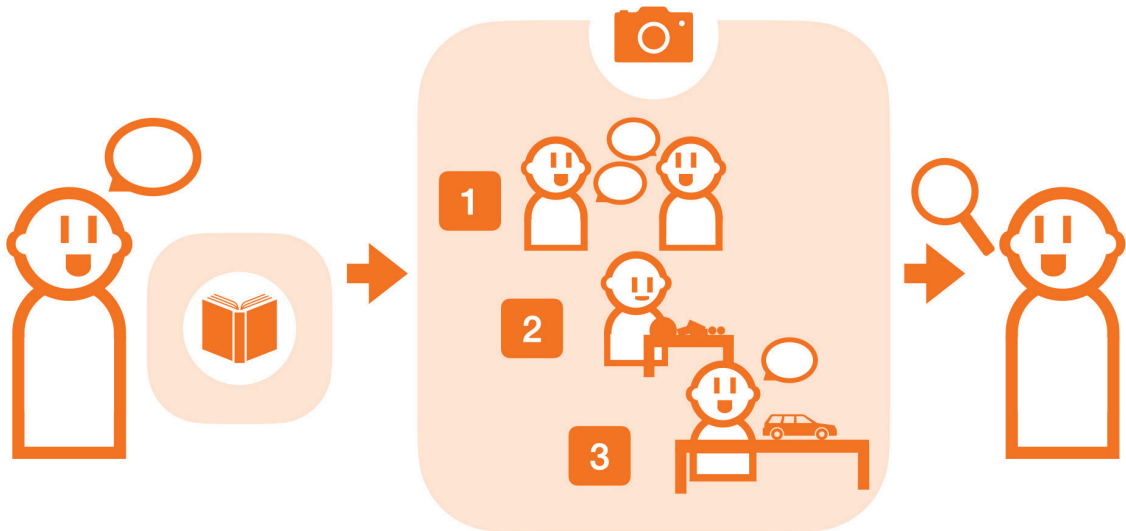


Figure 63: We organised a second workshop to evaluate the manual and the challenge sheets

## 6. Evaluation



# 6.2 Workshop 2: Video

Evaluated design elements:

1. Recruitment Video
2. Design Process as Workshop Structure
3. Increase in Solution Space
4. Questions in the Video

## Design Elements

Through this workshop, I aimed to evaluate the following specific design elements of the final toolkit:

### Recruitment Video

The recruitment video made use of the materials from the first workshop (MVP) to get other children enthusiastic about joining the workshop. It is described in chapter 5.4 and can be found in Appendix 6.

The facilitator used this video for reaching out to kids about joining this workshop.

### Design Process as Workshop Structure

The three phase structure of the design process (figure 64, page 62) informed the specific format of the workshop. Through the workshop we evaluated the format of the workshops themselves, as well as the effectivity of the specific phases in this context.

### Increase in Solution Space

The video aimed to increase the solution space in comparison to the first workshop (MVP). In that workshop the children had to design a car meant for a specific goal. The video gave concrete examples for using the clay to mould car parts, so their freedom was in deciding how the design would look.

In this workshop the kids had to design a building that solved a problem of their own choosing, but were not given examples or a specific type of building to make.

### Questions in the Video

I put much effort in phrasing the questions in such a way that they wouldn't dictate the framing of the challenge in a specific direction too much. The role the video played in the workshop was further evaluated with the help of the facilitator.



This workshop was supported by step-by-step instructions (Appendix 6) and the video (Appendix 5) described in chapter 5.4.

Sixteen children participated in the workshop, 10 boys and 6 girls, but 20 were present in total.

## Evaluation of the Workshop

### Phase 1

In the first phase, 'Exploring the topic and defining your goal', the facilitator showed the video to the participating children with a projector (figure 65). The participating children were of different ages and had different levels of English proficiency. To mitigate this, the facilitator translated the questions and gave examples to the kids. He mentioned that paraphrasing the on-screen text allowed him to adapt the questions in the video to the situation, adjusting the complexity. For further use of the toolkit, English seems to work well for SRI. It gives the facilitator more responsibility for the discussion, but also more freedom to adapt the questions to the situation. That being said, the facilitator did say that not all children participated in the discussions that were provoked by the questions. This could be down to their understanding of the questions (i.e. too high complexity), there being too many to keep them engaged, or just shyness. There are no conclusive answers that can be drawn from just the facilitator's account of the workshop.

### Phase 2

At the start of phase 2, 'Building and testing your idea', the children first gathered clay to build their prototypes with (figures 67 and 68, page 62). After that the kids had about an hour to model their buildings (figures 69-72, page 64). The facilitator said the kids were all highly engaged while creating their prototype, and enjoyed the process. (Text continues on page 63)

## 6. Evaluation

Exploring the topic  
and defining your goal



Building and  
testing your idea



Presenting your  
design



Figure 64: The design workshops always follow the same three phase structure



Figure 65: Facilitator showing the video



Figure 66: Kids watching the video together



Figure 67: Collecting clay



Figure 68: Bringing back the clay to SRI

## 6. Evaluation

He said the three boys who participated in the first workshop (MVP) created elaborate designs, suggesting they became more comfortable with the process and were developing their design skills.

### Phase 3

In phase 3, 'Presenting your design', the children were supposed to present their prototypes one by one, after which the other kids could ask questions and finally give the presenter feedback on his or her design.

However, the facilitator said he did not have enough time to do phase 3 with the children, in part because there were so many children, but also because after the earlier two phases the kids had no more interest in doing another activity. It is difficult to make a definite conclusion in regards to why phase 3 did not work in its current form. Instead he asked four kids what they created: one kid made a big supermarket, because the area he is from only has small shops. The other three children he asked to show their work all created residential buildings, but they all created very different looking designs. It would be valuable to find a format that allows the kids to see each other's work, as it would help them to realise the 'size' of the solution space of the challenge, and the diverse solutions you can find for it.

### Design Elements

The recruitment video proved to be successful in getting the children enthused about joining the workshop. Perhaps it even worked too well, as more children showed up than reasonably could be facilitated by one person.

It seems that the increase in solution space allowed for a wider interpretation of the challenge by the children in comparison to the previous workshop. Although most of the children prototyped houses, they did come up with diverse designs. The video and the questions in it could further be polished to help the children solve a specific problem. No real conclusions can be drawn as phase three, when the children were supposed to make their thoughts and considerations behind their design clear, wasn't done.

### Summary of Findings:

- 1. The recruitment video helped to get the children excited to join the workshops. SRI could develop a privacy sensitive version to use in local schools to enthuse kids to join the activities.**
- 2. The kids seem to enjoy the workshops. They came in great numbers and were actively engaged during the activity. They came up with diverse designs and took pride in what they designed.**
- 3. The process structure helps both the kids and the facilitator in the workshops. However, the third phase was skipped. The facilitator instead asked a few kids what they created. It could be that phase 3 in its intended form was too time-consuming for the facilitator and the children. It would be valuable to consider changing the format to still help the kids to realise the solution space and the diversity in solutions it offers.**
- 4. The video introduces the topic to the children, and helps them to decide what they will prototype. The video still requires a facilitator to translate and interpret as many children do not speak English well. However this does cause the facilitator to more actively engage with the video, and allowing him to 'tailor' the solution space to the right level for the participants.**
- 5. The increase in solution space seems to work, as the facilitator mentioned that the boys who also participated in the previous workshop created elaborate designs, suggesting they became more comfortable with the process and were developing design skills.**

---

**“I didn't imagine the kids would come up with such diverse designs.” ~ the facilitator**

## 6. Evaluation



Figure 69: Boy with his design



Figure 70: Girl working on her design, while others watch



Figure 71: Boys working on their prototypes



Figure 72: Girl with her design



# 6.3 Workshop 3: Challenge Sheet

### Evaluated design elements:

1. Toolkit manual
2. Challenge sheets

## Design Elements

### Toolkit manual

Prior to the workshop I sent an early, but only slightly different, version of the manual (Appendix 3) to the facilitator. In the manual the process and underlying principles are explained to the facilitator. The manual replaced the separate facilitatory guides that had been used up until this workshop. However, those guides are available in a more unified format in the manual.

### Challenge sheets

The manual also introduced the format that the facilitator could use to further organise workshops in the same manner as the previous ones. Based on the format that we used up to this workshop, the challenge sheets give the facilitator a simple three part format for coming up with a story to introduce the topic and the challenge to the kids (figure 59, page 56). The challenge sheet that the facilitator used (figure 73, page 66) shows the steps necessary to organise the workshop, and gives several options for the challenge, suggests a story and gives further suggestions with practical tips for organising the workshop.

Through this workshop we thus aimed to evaluate whether the tool would be successful in helping the facilitator organise future workshops at SRI, ensuring the continuity of this project.

## Evaluation of the Workshop

### Phase 1

The facilitator used the second ‘recruitment video’ (Appendix 4) to introduce the children who happened to be present at the community centre to the workshop. I created the video with footage the facilitator took during the previous workshop. Several kids who also participated in the previous workshops could recognise themselves and their work (as they received unblurred versions of the video). According to the



11x   4x

**This workshop was supported by the first challenge sheet in the manual (Appendix 3) Fifteen children participated in the workshop, 11 boys and 4 girls. 23 children were present in total.**

facilitator, it was highly motivating to see their own work and that of their peers in the video.

Based on the challenge sheet shown in figure 73 on page 66, the facilitator created a story to introduce the children to the challenge. He had the children imagine they were the protagonist of a story he adapted from the one suggested in the challenge sheet. Having read the manual (Appendix 3), in our evaluative call he noted the importance of giving the kids enough room to explore and decide on a suitable solution to the challenge themselves. This is promising, but I do not know how he exactly made that story and what questions he asked the kids to trigger their process.

### Phase 2

The kids first gathered materials, after which they started to prototype bridges to help the protagonist of the story reach the other side of a river. Like in the previous workshops, they mainly used clay, but the children also made use of plywood boards they found. According to the facilitator, this was partly because the season was becoming dryer, and it was hard for the kids to find enough usable clay. This was the first time the kids did not have a video that suggested solutions to them. There were several children who had already participated in the previous workshops, who thus had an idea of what materials they could use and how they could design a solution. The facilitator noted how the children inspired each other to come up with certain design elements, but still all came up with distinct final designs.

## 6. Evaluation

# Workshop 3: Who can build the safest bridge?

Competition



### Preparation

Prepare two bricks or stones to act as river banks for the children to build their bridge across.



### Story

Use the suggestions to create a story for the challenge. You could also make the story about having to cross the 'river' with their toy car.



### Prototyping

Give the children the chance to collect materials and ask them to prototype their solution for the problem in the story.



### Presentation

Ask the children to present and test their way of getting across the 'river' one by one. Give them the opportunity to give feedback to each other.

### Options

You could challenge the kids: who can build the best bridge?

or

Give an open-ended story: in what way can you cross the river?



A girl is walking to the next village with her new shoes on



There is a river but she wants to keep her shoes dry



Help her get across the river without getting her shoes wet

### Suggestions

You can use two big bricks to act as the river banks for the kids to build a bridge across. Additionally, you could use something as a weight to test if the bridge is 'strong enough' to support their toy car.



Figure 73: The manual gives the facilitator the tools to come up with more workshops for the kids



Figure 74: The facilitator explains the workshop



Figure 75: The kids watch his presentation

## 6. Evaluation

### Phase 3

Just like last time, the facilitator mentioned there was not enough time for the third and final phase of the workshop. Also because there are so many children present at the same time, presenting to all of them one by one is a big time investment, and takes a lot of effort from the facilitator.

He asked several kids to explain what they created (figure 78, page 68). In these explanations it was interesting to hear the deliberate design choices some of them made, for example the kid who made a bridge with steps to ensure no motorists could use it, in an effort to ensure the safety of the pedestrians.

### Design Elements

In regards to the manual the facilitator mainly stated his realisation that if the information was too much the children would be steered towards specific solutions. He confirmed that he realised the importance of giving the children a big solution space to freely come up with solutions for the design challenge, while still effectively explaining the challenge to kids. I could not evaluate how the facilitator introduced the topic and story to the kids, and I thus cannot say to what degree he directed the children in their designs.

Looking at the results from this workshop, the challenge sheets seem to have been successful in their role of helping the facilitator organise a workshop without a video to support him. With the help of the previous workshops and the manual, he has developed a successful way of recruiting the kids and subsequently giving them a fun and valuable activity. I take this as an indication that the challenge sheets can help him to further develop this format and make it his own. The question remains if the challenge sheets can help also help the other SRI employees to organise workshops in the future.

### Summary of Findings:

- 1. The challenge sheets and the manual seem to have helped the facilitator in organising the workshop. The question remains how the challenge sheets can help the facilitator in the future, and how the manual will help the facilitator to spread the method to his colleagues at SRI.**
- 2. In the workshops that were supported by videos, the facilitator already had an active role in translating and interpreting the questions, as some of the kids did not speak English. The challenge sheets helped him by suggesting a story that he adapted to fit the situation of the kids.**
- 3. Phase 3 of the workshop was skipped again, further supporting the conclusion it does not fit the workshop in its current form. Instead, the facilitator asked several kids to show their designs to him and tell him their considerations and decisions in their process. If this is more suitable than the format I originally designed, it would be great for the facilitator to further develop this phase in that way. It is important to make the facilitator aware of the underlying intentions of phase 3, such as teaching the kids how to communicate their considerations and intentions, how to give feedback, and making them aware of the diverse solutions the other kids come up with, illustrating the solution space.**

---

**“The kids who’ve participated in the previous workshops could help the other kids.” ~ The Facilitator**



## 6. Evaluation



Figure 76: Boy building a bridge



Figure 77: Kids working on their designs on SRI's patio



Figure 78: The kids showing their work to the facilitator

# 6.4 Evaluation with stakeholders

## Interview with Kids

During a short interview with some kids who joined the workshop, I asked the kids their opinion on the project directly. The children mainly liked coming up with new ideas and making the models of their ideas. A few kids mentioned they might want to become an architect or get a job in engineering in the future.

When asked what they would build in the future, they replied aeroplanes. They did not come up with other possibilities themselves yet, showing the learning was still only directly applicable to the context of the workshops themselves. This is further confirmed by what they replied when asked about if they felt like they learned anything. To this question the main reply was that they now learned how to make a moving car out of clay and how they could build stronger structures.

## Interview with SRI

In the closing interview with the SRI staff, represented by the facilitator and the initiator of the project, we discussed the project, its results, and how SRI will continue with the results from this project. The project was somewhat of a first of its kind for both sides. Due to the pandemic the project was done entirely virtually. This brought along new challenges, such as finding a way to get to know each other, how to explore and understand the context, and finding a medium that would work in this specific situation and context. The final result has shown to yield worthwhile workshops for both the kids and SRI, and the design's format surprised in its potential for transferring skills related to other topics and its apparent applicability outside of the current context too.

The facilitator mentioned how he noticed the developments in the kids' designs. They came up with different and more elaborate structures for their designs than before. He felt confident the materials and his experience during this project would be enough to transfer the necessary skills and knowledge about the design process and skills to his colleagues at SRI.

The project has also shown potential as a valuable way of bringing more children to SRI by offering them these fun and educational experiences. They can then also be involved in other educational programmes that SRI offers. The staff can use the delivered materials to organise workshops in the weekends, or even further develop it into a programme for children.

SRI was also enthusiastic of the possibilities for scaling up this format. They see potential to use the format to reach more people, through for example showing the recruitment videos in local schools that SRI works with, and by showing parents what SRI can offer their kids. Furthermore, the initiator of the project was also enthusiastic about teaching other skills to the community, for example by developing a 'module' with a similar format for people who want to learn woodworking skills at SRI's facilities. The toolkit format, and the videos specifically give the impression they can be valuable in helping SRI to raise awareness, reach people for future collaborations or even to secure funding over the internet.

## Summary of Important Insights

- 1. The kids had fun during the workshops and came up with diverse designs.**
- 2. The kids mentioned they felt inspired to do engineering jobs after having taken part in the workshops.**
- 3. The project has proven its potential in getting more children enthused about taking part in activities at SRI.**
- 4. The kids said the main things they developed were their clay modelling skills. It would be valuable to make the children more aware of the skills they practised, perhaps through an improved final phase of the workshop.**
- 5. The people at SRI felt the project's results were sufficient to be able to continue the workshops in the future. The project's unique set up has yielded results that SRI can use to develop other 'modules' for teaching skills at their facilities.**

# 6.5 Evaluating on the four pillars

### Remembering the questions:

1. Fun - Are the children engaged in the activity provided by the workshop? Do they enjoy it? Are the activities clear and fun?
2. Curiosity - Are they inspired by the activity, do they feel like they have learned from the activities? Are the design skills being transferred to the children? Are the children coming to SRI?
3. Clarity - Are the facilitators able to organise the workshops and empower the children's process? Are the instructions clear? Do the children understand the steps they should take? Are the graphics understandable?
4. Continuity - Does the toolkit work in the context? Is it repeatable? Do the children have the necessary skills now? Are there other things necessary before another workshop can be properly hosted in the future?

### Summary of Important Insights

1. **Fun** - The children are actively engaged with the activities, seem to enjoy it and several of them returned a couple of times to the workshops. They understand the steps that they have to take.
2. **Curiosity** - It seems the introduction to design through these workshops made the kids aware of the possibility of doing engineering job. The learning they felt they did mostly related to the activity of prototyping with clay itself. In the future it would thus be valuable to make them more aware of the other skills they're developing through the workshops.
3. **Clarity** - The facilitator showed and confirmed he felt confident organising more workshops in the future, and even transferring the knowledge to his colleagues. The materials support him in doing so. However, phase 3 of the workshops needs to be adapted to fit the workshops better, as the facilitator was not able to organise that phase as intended. If the facilitator is to adapt the phase to better suit his way of organising the workshop, it is important to make him aware of the underlying intentions of this phase, such as teaching the kids how to communicate their considerations and intentions, how to give feedback, and making them aware of the diverse solutions the other kids come up with, illustrating the solution space.
4. **Continuity** - The people at SRI feel that the toolkit works well and that they have enough knowledge to continue with the toolkit. The questions that remain are: A. How can the people at SRI further develop the contents to offer kids a broader skill development programme and B. How can this model (i.e. videos and workshops) be adapted for teaching other skills at SRI?

# 6.6 Design recommendations

## Improving the toolkit

To further improve the toolkit the third phase of the workshops ‘Presenting your design’, needs to be improved. It is too time-consuming and demands an involved role of the facilitator. Through that phase, I aimed to allow the children practise their communication skills, as well as develop their ability to reflect and give feedback. However, in the current version of the toolkit, the kids are not made aware of this enough, which also limits their ability to actively develop those skills further. The toolkit would benefit from a way of making the kids more aware of what skills they practised besides the ones directly related to clay modeling.

Secondly, the toolkit would benefit from giving the facilitator further ways to more actively develop his role, and the necessary skills, such as tailoring the solution space to children, giving feedback, and helping the children to develop their design skills.

## Further development at SRI

The toolkit format, with workshops and supporting videos proved to be desirable for SRI, as it can be used to transfer knowledge from partners with specific expertise to SRI’s employees, who can in turn teach people of the local community these skills. It is a scalable medium, both in how many people can be reached and where the skills and knowledge can come from. For SRI this opens up the possibility to work with other partners, such as universities or non-governmental organisations to teach skills that are needed in the community. These skills could for example be design skills for adults, but also specific agricultural methods, construction skills, or IT skills.

## Suggested Research

Finally, the toolkit and its workshops could be valuable for use in other places as well. Because of its low up front costs and digital nature, it can easily be shared. The contents of the toolkit were designed with a strong focus on the materials that are available at SRI’s community centre and uses English in the manual and videos. These are both things that might have to be changed before it can be used in other contexts too. An interesting approach would be to see if a more visual ‘universal’ toolkit could be developed, or if other organisations can be helped in some way to adapt the toolkit to their specific context. To do so, other organisations like SRI in Kenya, East Africa, and even other continents can be contacted to test the toolkit. The ultimate goal would be to see the toolkit empower organisations to reach more children, and by reaching those children giving them the opportunity to develop valuable design skills.

# 7. Discussion & Conclusions

In 7.1 'Discussion of Project, Design, and Results' I first discuss the project and the approach, then the toolkit's design, and finally the results.

In 7.2 'Personal Reflection' I share my personal reflection on the project.

In 7.3 'Acknowledgements' I conclude the report by thanking the people who have helped me during this project.



# 7.1 Discussion of Project, Design, and Results

## Project Approach

Due to the COVID-19 pandemic, we had to find a way to still make this project happen. In previous projects that SRI had done with students, the students would always come to Okana to do their research and come up with a solution. This was obviously not possible during the extensive lockdowns that were enacted in both Kenya and The Netherlands. Going to SRI to visit, see the surroundings and talk to people there would have given me the opportunity to gain an understanding of the context and users earlier, as well as the ability to quickly try designs myself. Due to the digital nature of all our interactions (and lack thereof at the start), it took a while to understand the context and to distinguish the main concerns from the smaller side issues. As we never discussed topics such as the cost of the video calls, and there turned out to be no funds to do that, quickly starting with the co-exploration activities (those described in Chapter 2.7) helped to get insight into the context early-on. The approach was shaped as I got a better understanding of the context and of what was possible. The limitations, such as only being able to collaborate over the internet and working between two different contexts, have shaped the approach and dictated the final design, its contents and the way the design could be evaluated.

### Limitations

The approach we took had the benefit of being highly iterative. This meant that through continuous learning and improvements, we could mould the final design into something that was shown to be effective for SRI. A limitation that should be considered is the fact that all qualitative data that were gathered during the studies were gathered by the facilitator. This means that the all data I received were those he thought to be important, or perhaps that he thought I would want to see. Being there myself would have allowed for a more unfiltered assessment of the activities and surroundings, although those data would have been shaped by my own biases. Also, because of the time limit on the project, it is difficult to say whether the project results will actually be used in the future,

which would be the real measurement of success. The effectivity of the manual could be further evaluated on whether the facilitator can effectively use it to transfer the knowledge he has on organising workshops to his SRI colleagues.

### Similar Projects in the future

The difficulties that we experienced during this project were mainly down to the way we had to collaborate and the difficulty of understanding another culture and context just through available online materials and sporadic calls over the internet. On top of that, most of the activities that were usually taking place at the community centre came to a halt because of the pandemic. Both SRI and I were lucky to be able to make use of the results and media from previous TU Delft student projects that were publicly available. However, if SRI wants to continue using this or a similar approach, perhaps as it takes less effort from their side and they have gotten familiar with it through this project, it would be wise to invest in, for example, making some videos to help the students (or other collaborators) to get a broader and richer understanding of the culture and context early on in their projects. I still feel there is a lot of richness that is lost in comparison to the way these projects have traditionally been done in the way results are gathered, the depth of analysis it allows, and above all, in how the collaboration is experienced on a personal level. However, the constraints of the situation also gave us the opportunity to find a different way of going about collaborations between organisations such as SRI and students. It yielded surprising results that are valuable to SRI, the kids and the community of Okana. The format that I gradually developed during this project has shown a way of working that can be valuable for SRI to be able to transfer external expertise to the community in a sustainable way, even when COVID-19 regulations are further lifted.

## 7. Conclusions

### The Design

From this project SRI has gained a toolkit, consisting of a manual and several videos, that has proven to allow them to host educational design workshops for children. In the beginning of this report, I discussed the importance of both financial and environmental sustainability for a viable and desirable result for SRI. Although only time will tell whether the results from this project are going to be used at SRI in the future, the results from the evaluative studies show that the SRI staff successfully and independently hosted several workshops, only making use of the toolkit and the materials that were available at the community centre's grounds, such as wood and clay.

### Design Decisions

I tried to give the design activity the characteristics of a good toy in an effort to make it playful, using the insights into design literature and existing design education toys from my explorations. Of course, the children were also designing toys themselves in these workshops. However, the workshops do not put emphasis on helping the kids design a toy that is long-lasting or one that is specifically 'good'. The focus in the workshops was to create something from scratch with just what is available in their surroundings rather than teaching them how to make a 'good toy'. In part because the main material that was used, clay, lends itself well to prototyping, but is not very lasting, unless fired. Another reason was that I if wanted to teach kids design skills, I needed to enthruse the kids to partake in a design activity in the first place. From the activities that we organised early on, I realised a school-like approach would be unsuitable for SRI's context. The method I used was too costly for SRI, and was aimed at solving quite complex problems. On the other hand it was well organised and it structured the design process clearly. I thus organised the design process in three phase structure and linked the skills that we wanted the kids to develop to the phases in that structure. By first using videos I could introduce both the kids and the facilitator to that structure in a clear sequence for the activity. I built on the insight

that creating toys is a common form of play to help the kids further develop design skills by structuring that natural design process, allowing them to express their own interests, culture, and beliefs; they are designers of their own toys and playful learning process from the start.

### Desirability and Limitations

The kids showed great interest in taking part in the workshops. Some children even joined several consecutive workshops. The SRI staff confirmed the kids' enthusiasm, which made them confident and excited about the toolkit and its potential, especially in reaching more kids for this and future projects by, for example, showing the videos in local schools. However, it is too early to be able to conclusively say if the toolkit is effective in teaching design skills, although that was suggested by comments the facilitator made during the workshops. Further evaluation of the toolkit is necessary to be able to convincingly argue that is the case.

Another point that needs to be evaluated is whether the facilitator will be able to transfer the knowledge he gained to his colleagues to ensure longevity for the toolkit at SRI. A promising first sign of this being the case is the fact that the toolkit inspired the idea for further developing similar 'modules' for teaching other skills at SRI. This way of working, i.e. stepwise knowledge transfer supported by videos, can be used to bring other external knowledge to SRI, that can then be taught to the local community.

### Contribution to design field

The results of this project have shown a way to reach children in rural Kenya with fun design activities. However, because of the evaluation's scope, nothing can be said about transferring the design to other contexts yet. Despite the interest in teaching kids in similar contexts 21st century skills, that are related to design skills, there is a lack of practical solutions to do so. I hope this project can inspire others by showing a way to reach children in these contexts and allowing them to get in touch with design and to develop these skills, that can be of value all throughout their lives.

# 7.2 Personal Reflection

## Culture shock

I guess a culture-shock-like experience will come sooner or later in these international projects, even when working together digitally. In hindsight, I'm glad that mine came at an early stage of this project. It meant that I was confronted with several issues early on, when there was still enough time to adapt to them. These issues that I experienced mainly related to the things we did not discuss prior to starting the project, such as what budget would be available, and who would be responsible for that. At the start I held several assumptions about what was already available and still required by SRI, and what they expected of me. In addition to that working in this digital way means that it is hard to get a more concrete vision of the progress you are making. The lack of contact and limited depth of the information you get can often cause the progress to feel slow. Part of the project was finding ways to mitigate that. Now that I know what the difficulties are, if I were to work in a similar way again, I would more explicitly state the necessities and requirements up front. Despite that, I have noticed that I have improved in handling that uncertainty much better than I was able to before. What did make me nervous was the question whether I could still contribute something that would be of value to SRI, without compromising my values and what I think is important.

## Pragmatic Idealism

Working in close collaboration with SRI has taught me how to be true to the values you want to carry out, and still be pragmatic about how you reach the goals you set. When confronted with each other's assumptions and wishes, I had to adjust my plan to truly be in service of them, while still being aware of my own agenda to be able to reconcile their wishes with my own. Only in that way can you truly deliver something of value that works to benefit both involved parties. It is impressive to see all the things SRI does for the community of Okana, and I feel incredibly thankful to have been able to contribute to that. I'm thankful that I had the opportunity to spend almost

half a year on doing something in collaboration with an organisation that truly makes a positive difference in people's lives. It has been highly motivating for me to see how the work I did has given a fun activity to the kids during the period of this project, but hopefully for a long time to come. The moments that I worked with the facilitator and got to talk to the kids kept me wanting to improve and iterate on the design. It made the occasional moments of pessimism induced by sitting behind my computer all day totally worth it.

## Simple solutions

Through this project I have realised how iteration helps to truly shave off the convolutions of a design. We're all aware of the 'less is more' mantra, but as with many things, that is more easily said than done. I actually grew very fond of the highly iterative approach, as it allowed me to constantly test my assumptions and then quickly make new versions of my designs based on the findings I did with my partner in Kenya. This constant collaboration is much preferable over designing for someone who you can only speak to only a few times in a project. On top of that it helps to create a sense ownership of the design with the target user, as they are along on the journey to make it a success. Besides it having been a pleasure to work with the facilitator on SRI's side during this project, I feel like you can have more real impact this way.

## Personal Development

Exploring the literature on play, toys, and design education in combination with finding a way to instrumentalise that knowledge to the children's benefit has been an exciting journey. Playing a small role in these children's development while working on my own has been truly motivating for me. I hope to be able to continue to explore topics that I find interesting, to keep being inspired by many different things to create, while allowing others to explore, be inspired and create as well.



### 7.3 Acknowledgements

First and foremost I want to thank Ken Omondi for his tireless efforts in helping me make this project a success. Once it is possible to travel again, I hope to finally meet you in person, and to see with my own eyes what we created for the kids and SRI together. I couldn't have done it without you!

A big thank you to my supervisors, Annemiek van Boeijsen and Mathieu Gielen for the freedom you gave me during this project, all your thinking along, your indispensable expertise, and the illuminating feedback and encouraging support you gave me when I needed it. True to form for this project, even though we were geographically close in comparison to the others who were involved, we too did all our meetings digitally. I hope to meet both of you in person soon, so I can properly thank you for your involvement in this project.

I want to thank James Otieno Jowi for initiating this project. I'm thankful to have been able to contribute a little bit to the invaluable and inspiring work that is being done by you and everyone at SRI.

Of course, I also want to thank all the children for the time and hard work they put into the activities. I have found it incredibly inspiring to see all the beautiful, diverse things you built and an absolute pleasure to see the fun you seemed to have together during the workshops.

I especially want to thank my friends Ronja and Irene for their support and good company during the days we were allowed to be on campus, despite the pandemic. Those days have made all the difference to me and the quality of my project.

In addition to dragging me through the occasional lows, I want to thank my friends Dion, Stijn, and Michael and my mom, dad, and sister Rosa for sharing their critical insights to improve my work.

# 8. References

In 8.1 'Literature', you can find all the literature referenced throughout the project.

In 8.2 'Figures', I give the sources of all the figures that weren't my own or the SRI staff's work during this project. If the figure is not in this list, it means it was made specifically for this report.



### 8.1 Literature

- van Boeijen, A., Daalhuizen, J., & Zijlstra, J. (2020). *Delft Design Guide* (revised edition): Perspectives - Models - Approaches - Methods (Revised ed.). Amsterdam, Netherlands: BIS.
- Chomsky, N. - On Being Truly Educated. (2015, May 26). [Video file]. Retrieved from <https://www.youtube.com/watch?v=eYHQcXVp4F4>
- Else, P. (2009). *The value of play*. Bloomsbury Publishing.
- Fisher, K., Hirsh-Pasek, K., Golinkoff, R. M., Singer, D. G., and Berk, L. (2011). *Playing around in school: Implications for learning and educational policy*. In A. D. Pellegrini (Ed.), *Oxford Handbook of the Development of Play*. Oxford University Press.
- Galimberti, G. (2014). *Toy Stories – Gabriele Galimberti*. Gabriele Galimberti. <https://www.gabrielegalimberti.com/toy-stories/>
- Gielen, M. A. (2010). Essential concepts in toy design education: aimlessness, empathy and play value. *International Journal of Arts and Technology*, 3(1), 4. <https://doi.org/10.1504/ijart.2010.030490>
- Gosso Y, Almeida Carvalho AM. *Play and Cultural Context*. In: Tremblay RE, Boivin M, Peters RDeV, eds. Smith PK, topic ed. *Encyclopedia on Early Childhood Development* [online]. <http://www.child-encyclopedia.com/play/according-experts/play-and-cultural-context>. Published June 2013. Accessed November 10, 2020.
- Klapwijk, R. (2017). *Creativity in design. Teaching design and technology creatively*, 51-72.
- Klapwijk, R., & van den Burg, N. (2019). *Formative Assessment in Primary Design Education -involving pupils in clarifying the learning goal of divergent thinking*. Presented at the PATT Developing a knowledge economy through technology and engineering education, Malta, Malta. Retrieved from [https://www.researchgate.net/publication/334625873\\_Formative\\_Assessment\\_in\\_Primary\\_Design\\_Education\\_-involving\\_pupils\\_in\\_clarifying\\_the\\_learning\\_goal\\_of\\_divergent\\_thinking](https://www.researchgate.net/publication/334625873_Formative_Assessment_in_Primary_Design_Education_-involving_pupils_in_clarifying_the_learning_goal_of_divergent_thinking)
- KlooiKoffer. (2020). *KlooiKoffer – Lekker Samen Klooiën*. Retrieved November 16, 2020, from <https://klooiKoffers.nl/de-koffers/>
- Lego Education. (2020). *Iets voor iemand ontwerpen*. Retrieved November 16, 2020, from <https://education.lego.com/nl-nl/lessons/prime-invention-squad/design-for-someone#lesplan>
- Lubeck, S. (1996). Deconstructing “child development knowledge” and “teacher preparation.” *Early Childhood Research Quarterly*, 11, 147–167.
- Make.Do. (2020). *Makedo Education*. Retrieved November 16, 2020, from <https://www.make.do/pages/education>
- Okana Centre for Change. (2015, October 3). *Pavillions for Okana*. Retrieved October 23, 2020, from <https://www.youtube.com/watch?v=7ZqgTmjNJq4>
- Pavilions for Okana. (2015). *Pavilions for Okana*. Retrieved October 23, 2020, from <https://www.pavilions-for-okana.org>
- Roopnarine, J., Patte, M., & Johnson, J. (2014). *International Perspectives On Children’s Play (UK Higher Education OUP Humanities & Social Sciences Educati)*. Milton Keynes, UK: Open University Press.
- Smith PK, Pellegrini A. *Learning Through Play*. In: Tremblay RE, Boivin M, Peters RDeV, eds. Smith PK, topic ed. *Encyclopedia on Early Childhood Development* [online]. <http://www.child-encyclopedia.com/play/according-experts/learning-through-play>. Updated June 2013. Accessed November 10, 2020.
- SRI Website. (n.d.). *Our History - SRI*. Retrieved October 23, 2020, from <https://www.srikenya.org/our-history>
- Whitebread, D., Neale, D., Jensen, H., Liu, C., Solis, S.L., Hopkins, E., Hirsh-Pasek, K. Zosh, J. M. (2017). *The role of play in children’s development: a review of the evidence (research summary)*. The LEGO Foundation, DK.
- Your Turn - Co-Design with kids. (2018). *Co-design with kids – a toolkit for designers*. Retrieved November 17, 2020, <https://studiolab.ide.tudelft.nl/studiolab/codesignwithkids/background/>
- Your Turn - Co-Design with kids. (2018). *Experience Gatherer*. Retrieved November 17, 2020, from <https://studiolab.ide.tudelft.nl/>

## 8. References

studiolab/codesignwithkids/files/2019/03/Your\_turn\_Experience\_gatherer.pdf

- Zosh, J. M., Hopkins, E. J., Jensen, H., Liu, C., Neale, D., Hirsh-Pasek, K., Solis, S. L., & Whitebread, D. (2017). Learning through play: a review of the evidence (white paper). The LEGO Foundation, DK.

## 8.2 Figures

- Figure 3 - Collage, adapted from Rouwendal, E., & Straehle, L. (2018). Pavilions for Okana. Retrieved October 16, 2020, from <https://www.pavilions-for-okana.org/>
- Figure 4 - Collage, adapted from Rouwendal, E., & Straehle, L. (2018). Pavilions for Okana. Retrieved October 16, 2020, from <https://www.pavilions-for-okana.org/>
- Figure 5 - Collage, adapted from Rouwendal, E., & Straehle, L. (2018). Pavilions for Okana. Retrieved October 16, 2020, from <https://www.pavilions-for-okana.org/>
- Figure 6 - Zosh, J. M., Hopkins, E. J., Jensen, H., Liu, C., Neale, D., Hirsh-Pasek, K., Solis, S. L., & Whitebread, D. (2017). Learning through play: a review of the evidence (white paper). The LEGO Foundation, DK.
- Figure 7 - Galimberti, G. (2014). Toy Stories – Gabriele Galimberti. Gabriele Galimberti. <https://www.gabrielegalimberti.com/toy-stories/>
- Figure 8 - Skidmore, D., & Skidmore, K. (2014). Zambian Playtime. Retrieved October 5, 2020, from <http://dkskidmore.blogspot.com/2014/11/zambian-playtime.html>
- Figure 9 - Klapwijk, R. (2017). Creativity in design. Teaching design and technology creatively, 51-72.
- Figure 10 - Klapwijk, R., & van den Burg, N. (2019). Formative Assessment in Primary Design Education -involving pupils in clarifying the learning goal of divergent thinking. Presented at the PATT Developing a knowledge economy through technology and engineering education, Malta, Malta. Retrieved from [https://www.researchgate.net/publication/334625873\\_Formative\\_Assessment\\_in\\_Primary\\_Design\\_Education\\_-\\_involving\\_pupils\\_in\\_clarifying\\_the\\_learning\\_goal\\_of\\_divergent\\_thinking](https://www.researchgate.net/publication/334625873_Formative_Assessment_in_Primary_Design_Education_-_involving_pupils_in_clarifying_the_learning_goal_of_divergent_thinking)
- Figure 11 - KlooiKoffer. (2020). KlooiKoffer – Lekker Samen Klooiën. Retrieved November 16, 2020, from <https://klooiKoffers.nl/de-koffers/>
- Figure 12 - Make.Do. (2021). Make Do Explore [Photograph]. Retrieved from <https://www.make.do/collections/all-products/products/explore-5>
- Figure 13 - Make.Do. (2020b). Snapshot from the classroom [Photograph]. Retrieved from <https://www.make.do/pages/gallery>
- Figure 14 - Lego Education. (2020). Iets voor iemand ontwerpen. Retrieved November 16, 2020, from <https://education.lego.com/nl-nl/lessons/prime-invention-squad/design-for-someone#lesplan>
- Figure 15 - Your Turn - Co-Design with kids. (2018). Experience Gatherer. Retrieved November 17, 2020, from [https://studiolab.ide.tudelft.nl/studiolab/codesignwithkids/files/2019/03/Your\\_turn\\_Experience\\_gatherer.pdf](https://studiolab.ide.tudelft.nl/studiolab/codesignwithkids/files/2019/03/Your_turn_Experience_gatherer.pdf)
- Figure 21 - Rouwendal, E., & Straehle, L. (2018). Pavilions for Okana. Retrieved October 16, 2020, from <https://www.pavilions-for-okana.org/>
- Figure 22 - Rouwendal, E., & Straehle, L. (2018). Pavilions for Okana. Retrieved October 16, 2020, from <https://www.pavilions-for-okana.org/>
- Figure 23 - Rouwendal, E., & Straehle, L. (2018). Pavilions for Okana. Retrieved October 16, 2020, from <https://www.pavilions-for-okana.org/>
- Figure 27 - Ford Europe. (2014, September 23). Inside Ford's Clay Modelling Studio [Video file]. Retrieved from <https://www.youtube.com/watch?v=APNgS33HT3Y>
- Figure 52 - Saroff, R. (2019, July 3). Students dig deep in Anna Heringer's Clay Storming workshop. Retrieved December 16, 2020, from <https://www.gsd.harvard.edu/2018/03/students-dig-deep-in-anna-heringers-clay-storming-workshop/>
- Figure 54 - Saroff, R. (2019, July 3). Students dig deep in Anna Heringer's Clay Storming workshop. Retrieved December 16, 2020, from <https://www.gsd.harvard.edu/2018/03/students-dig-deep-in-anna-heringers-clay-storming-workshop/>

# 9. Appendices

- 1 - Minimum Viable Product (MVP) Facilitator Guide
- 2 - Storyboard MVP Video
- 3 - Final Concept: Manual
- 4 - Final Concept: Recruitment Videos
- 5 - Final Concept: Storyboard Workshop 2 Video
- 6 - Facilitator Guide Workshop 2
- 7 - Original Design Brief



# Appendix 1 - Minimum Viable Product (MVP) Facilitator Guide

## Let's design a toy car! - supplement to videos SRI Design Challenge 1

### Goal

Let the children practice several design related skills, while showing them they can go from nothing, to an idea, to finally developing that idea into something tangible. This is done by letting children go through a design process in which they make a prototype of a toy car from locally available materials such as clay and twigs.

*N.B. To be able to improve the workshop for next time, the process, and especially 'Part 3 - Designing and Prototyping', should be documented by video!*

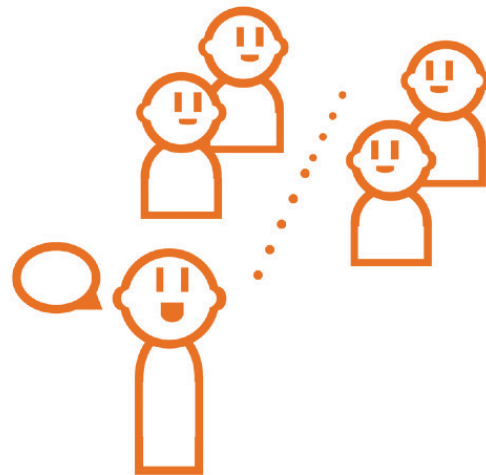
### Part 1 - Ice Breaker - Where do you stand?

In this exercise the children make their unique standpoints explicit by standing opposite of each other in response to several questions; What do they find important?

- Make two clearly marked opposing areas, for example by drawing a line in the sand. Ask the children to answer the following questions by standing on either side of that dividing line:

1. Do you like playing indoors or outdoors?
2. Do you like to play alone or together with others?
3. Do you like drawing or writing?
4. Do you like studying or doing home chores?
5. Would you rather walk or go by car?
6. If you could choose, would you like to have a car or a bike?
- 7.

*(For example: 'if you like playing indoors stand on the left, and if you like playing outside more stand on the right side of this line.')*



Part 1 - Ice Breaker

### Part 2 - Video & Discussing Questions - 20 -25 minutes

After finishing the questions, move to the computer or wherever you want to watch the video together with the children.

- Show the video to the children.
- When the video prompts a pause, pause the video and let the children discuss the question that was asked in the video.
- After giving the children some time to discuss the question, unpause the video and continue until the next time the video prompts a pause.



Part 2 - Video & Discussing Questions

The following questions are asked in the video:

- Question 1: What will the car you design be used

## 9. Appendices

for? (You can help the children by asking them to think of what cars and vehicles already exist and what they are used for: family cars, buses, taxis, fire trucks, ambulances etc.)

- Question 2: What materials can you use to make a toy car? (What can the children come up with? Afterwards an example is given of clay, bottle caps, and twigs)
- Question 3: What parts do cars have? (What can the children come up with? Afterwards some essential parts are highlighted: the wheels, windows, headlights, frame and car body)
- Question 4: How can you make those parts with clay, bottle caps and twigs? (Afterwards suggestions are given and shown in several example videos).

### Part 3 - Designing and Prototyping - about two hours

- Once the video is done, let the children collect the materials they want to use for making the toy (clay, twigs, wood, or whatever they come up with)
- Let them 'prototype' their toy car.
- While the children are working on their designs, you can help them by asking questions to help them make their goals explicit:
  - What is your car going to transport?
  - Where is it going to drive (e.g. on a highway, on a dirt road, on the plains)?
  - How many people can go in the car?
  - What is it going to look like?
- While the children are busy, prepare a table for the children to sit at one by one for the next step.



Part 3 - Designing and Prototyping

### Part 4 - Interview - a few minutes per child, about half an hour in total

- By now, we'll be in contact to have one on one video calls with the children. In the video call I will interview the children and let them show their design. I will ask the children:
  - Why did you build this car?
  - What purpose does the car have?
  - How and why did you make it like this?
  - What makes this car special?
  - If you were to change something about your car, what would you change?
  - What did you think of the video?



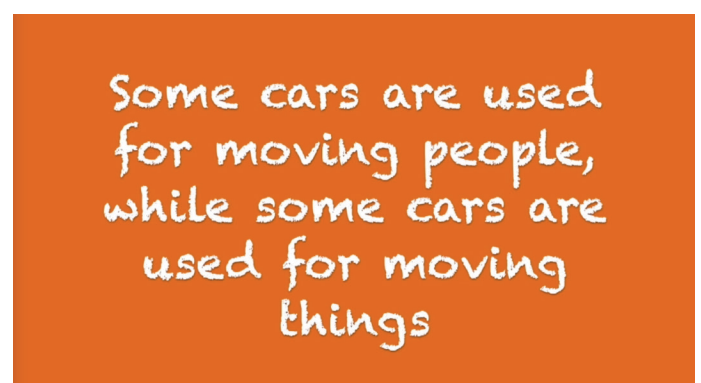
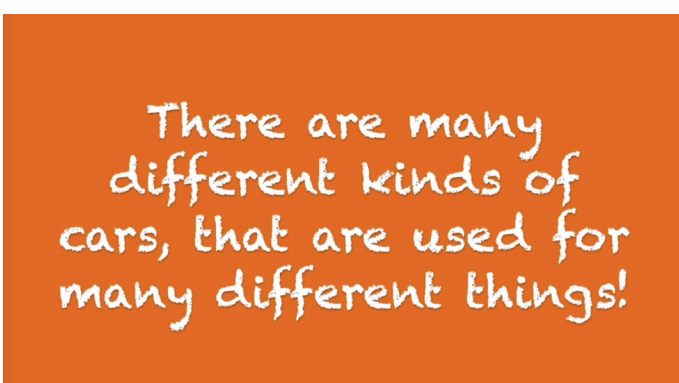
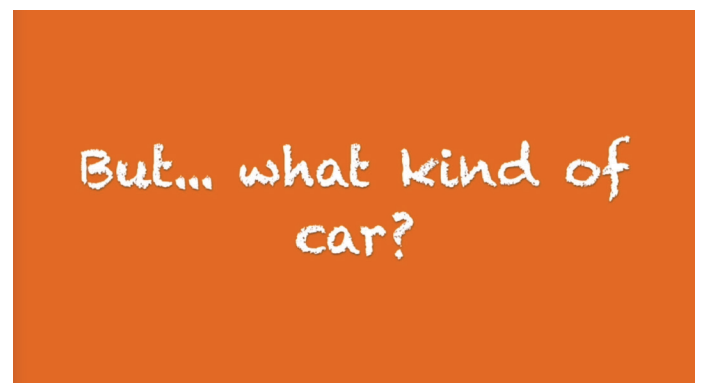
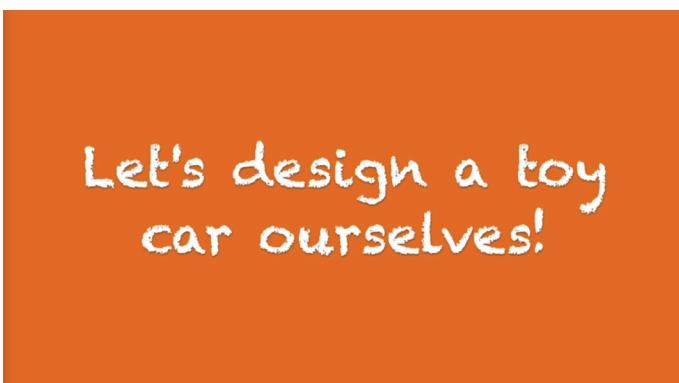
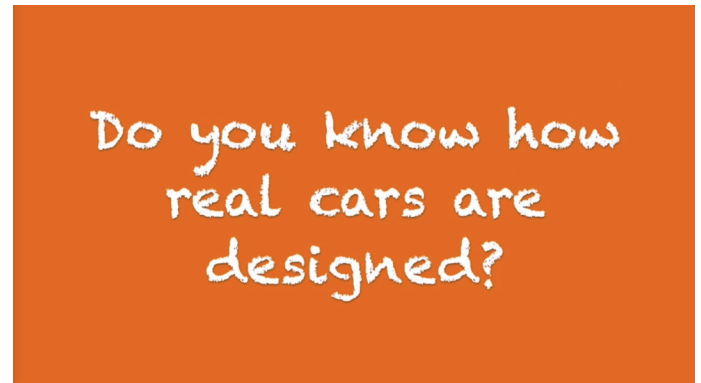
Part 4 - Interview

### Part 5 - Final Video - a few minutes

- The video congratulates the children for finishing the design challenge
- Secondly, the video makes the children aware of the design-related skills they practiced while working on the toy car.



## Appendix 2 - Storyboard MVP Video





## 9. Appendices

What will the car you will design be used for?



**Pause the video and discuss**

There are many different types of cars you could build as a toy!



Maybe you want to build an ambulance, or maybe a fire truck!

What materials can you use to make a toy car?



**Pause the video and discuss**

Did you come up with many different materials?

## 9. Appendices

Here are some examples of what you could use!

We only need some clay, bottle caps and twigs



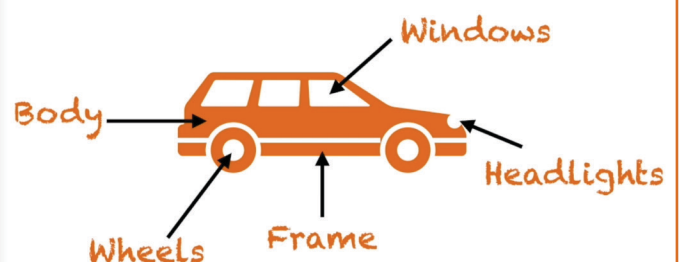
But... we also need to know what parts cars have before we can build a toy one

What car parts can you think of?



**Pause the video and discuss**

Here are five essential car parts. Did you think of any other parts?



## 9. Appendices

Now we have to think of how we should make those parts!

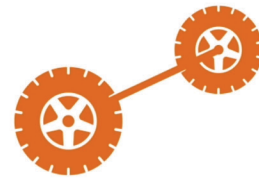
How can you make a toy car with clay, bottle caps and twigs?



Pause the video and discuss

Did you come up with some good ideas?

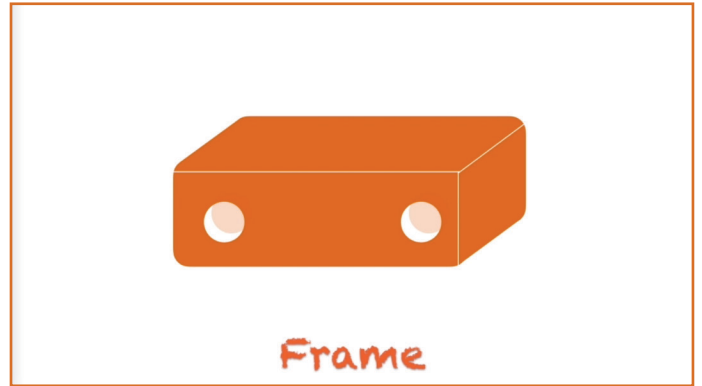
Here are some examples of how you could do it!



Wheels and axle



## 9. Appendices

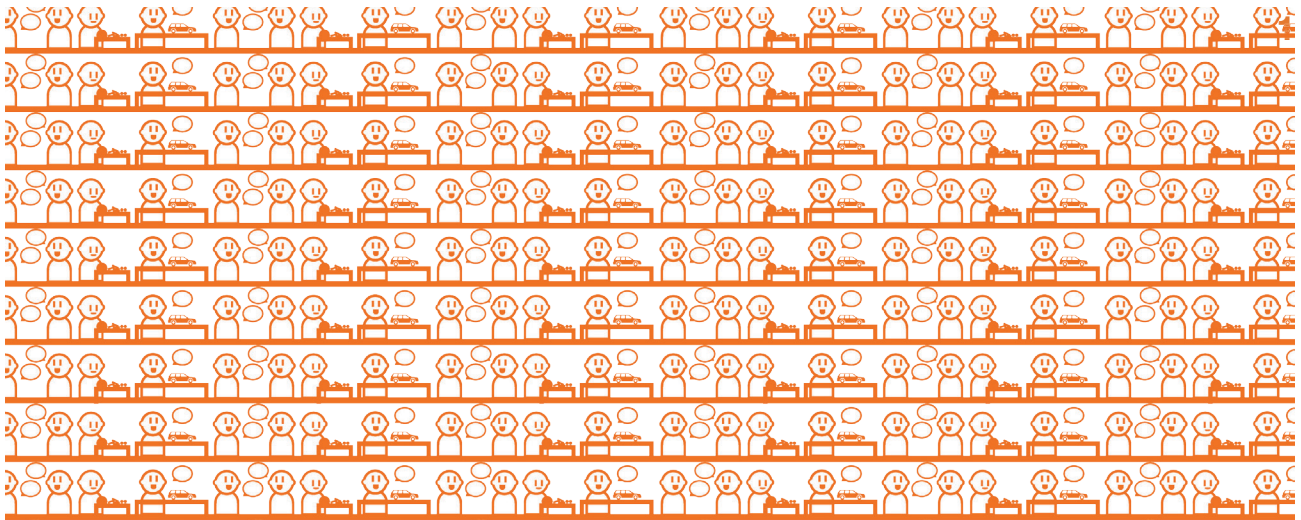


## 9. Appendices



Now it's up to you!  
What kind of car  
will you make?

# Appendix 3 - Final Concept: Manual



## SRI Design Toolkit Manual



2

### Introduction to the toolkit

This toolkit aims to help you organise several design workshops for children at the community centre. Through the workshops, SRI can offer children fun activities, while giving them the opportunity to develop their creativity and practise several design-related skills.

In this manual you can find all the information you need as a facilitator of these workshops: first the workshops and the educational element are explained, then step-by-step instructions for the first two workshops are given, and finally suggestions for organising further workshops conclude this manual.



## The workshops explained

The focus in the design workshops lies on 'building something out of nothing'. This is done by introducing a topic to the children and after discussing it, building a solution that they finally present to the other participants. In this way the children practice several design skills, which are further explained on the opposite page. The first workshops are more directive in how they steer in what way the challenge should be solved by the children. However, as the children become more acquainted with the design process, the challenges in the workshops also become more open-ended in the way they can be solved.

For you as facilitator of these workshops there is also a progression outlined in the freedom and responsibility you have in organising the workshops. The first two workshops are supported by videos that introduce the topic of the challenge and support the children's discussions during the workshop.

The questions and discussion help the kids narrow down the requirements for their designs.

From the third workshop onward you have to take on the role that the video performed in the first two workshops: introducing a topic, asking questions and facilitating the children's discussion to help them formulate their design goal. The manual gives you several 'challenge sheets' that help you to do so by suggesting a topic with a story to involve the children in the discussion, and an end goal for the children to work towards.

The workshops are structured to help you and the children get acquainted with the design process. For the purposes of these workshops, the process is thus structured in three phases:

- Exploring the topic and defining your goal**
- Building and testing your idea**
- Presenting your design**



### Design Process & Skills

In each of these phases the children practice specific design-related skills. In the first phase, the children practice collaboration and defining a direction, in the second phase they practice learning from mistakes and making

their ideas tangible, and in the third phase the children practice communicating their ideas and reflection. It helps to clearly state the goal of each phase to the children, so they understand the role each phase plays in the design process.

## Progression in the workshops

The first workshop is directive and gives the children specific examples to base their work on in the video. The second workshop further opens up the ‘solution space’ for the children. Solution space refers to the extent to which the kids have freedom in the way problem should be solved. In these workshops, this translates to not only asking the children to be creative in the way their design looks, but also in how they want to solve a certain problem. By having practised all phases of the design workshops several times, the children can take on more abstract

and complex challenges. In this way they exercise their creativity not only in how they give shape to the prototype, but also in what way they solve the problem. To facilitate the children’s learning process, the following workshops further decrease the directiveness in the challenge and further open up the solution space. As the children practice their design skills, you become more familiar with hosting the workshops. From the third workshop onward, you will have a more active role in facilitating and organising the workshop.





## Organising workshop 1

### Let's design a toy car!



#### Phase 1 - Video & Discussing Questions - 20 -25 minutes

- Show the video for workshop 1 to the children
- When the video prompts a pause, pause the video and let the children discuss the question that was asked in the video
- After giving the children some time to discuss the question, unpause the video and continue until the next time the video prompts a pause



#### Phase 2 - Designing and Prototyping - about two hours

- Once the video is done, let the children collect the materials they want to use for making the toy car (clay, twigs, wood etc.)
- Let them 'prototype' their toy car
- While the children are working on their designs, you can help them by asking questions to help them make their goals explicit such as: 'What is your car going to transport?', 'Where is it going to drive (e.g. on a highway, on a dirt road, on the plains)?', 'How many people can go in the car?', and 'What is it going to look like?'
- Prepare a table for the children to sit at one by one for the next step

## 9. Appendices

9

The first workshop focuses on introducing the children to the design process. In the workshop the children go through a design process in which they make a prototype of a toy car from locally available materials such as clay and twigs.

### Phase 3 - Presentation - 5 minutes per kid

- The children take turns with presenting their design in front of the others. In the presentation ask the children to explain:
  1. *Why did you want to build this?*
  2. *What purpose does it have?*
  3. *How and why did you make it like this?*
  4. *What makes this special to you?*
  5. *What would you still change or improve about your design?*
- After the presentation moment, first let the other kids ask the questions that they have. Then let the children give feedback to the presenter by asking them: *'What did you like about the design?',* and *'What do you think could be improved?'*
- Finally, you can ask the presenter how he or she thinks those improvements could be made: *How can that improvement be made to your design?'*



### Phase 4 - Final Video - 5 minutes

- The video congratulates the children with finishing the design challenge
- Secondly, the video makes the children aware of the design-related skills they practiced while working on the toy car



## Organising workshop 2 Let's design a building!



### Phase 1 - Video & Discussing Questions - 20 -25 minutes

- Show the video for workshop 2 to the children
- When the video prompts a pause, pause the video and let the children discuss the question that was asked in the video
- After giving the children some time to discuss the question, unpause the video and continue until the next time the video prompts a pause



### Phase 2 - Designing and Prototyping - about two hours

- Once the video is done, let the children collect the materials they want to use for making the building (clay, twigs, wood etc.)
- Let them 'prototype' the design of their building
- While the children are working on their designs, you can help them by repeating the questions asked in the video to help them make their goals explicit: *'What is the purpose of your building?', 'Who is going to use it?', 'How is it going to be used?', 'Where is it going to be located?',* and *'What is it going to look like?'*
- Prepare a table for the children to sit at one by one for the next step

10

## 9. Appendices

11

In this workshop, the children are challenged to design a building. Where in the first workshop the children were shown examples, in this workshop they have to come up with how to prototype their solution themselves.

### Phase 3 - Presentation - 5 minutes per kid

- The children take turns with presenting their design in front of the others. In the presentation ask the children to explain:
  1. *Why did you want to build this?*
  2. *What purpose does it have?*
  3. *How and why did you make it like this?*
  4. *What makes this special to you?*
  5. *What would you still change or improve about your design?*
- After the presentation moment, first let the other kids ask the questions that they have. Then let the children give feedback to the presenter by asking them: *'What did you like about the design?',* and *'What do you think could be improved?'*
- Finally, you can ask the presenter how he or she thinks those improvements could be made: *How can that improvement be made to your design?'*



### Phase 4 - Final Video - 5 minutes

- The video congratulates the children for finishing the design challenge
- Secondly, the video makes the children aware of the design-related skills they practiced while working on the toy car



12

## Organising more workshops

As you become more acquainted with the format, the materials get less directive. After the first two workshops, you have to fulfill the role the videos performed in the first two workshops. It will be up to you to introduce the topic and steer the children's discussions. To help you do so, there are four 'challenge sheets', that can be found on page 14 -17.

The instruction on the opposite page explains how to use the challenge sheets for organising the further workshops.

Each sheet offers you a topic with a related challenge, suggesting a story to explain the challenge to the children and involve them in the workshop. Finally it gives several practical suggestions for organising that specific workshop.

# Coming up with more design activities

Instruction



**Story & Discussion**

Tell the kids a story to help them understand and then discuss the problem.

**Prototyping**

Ask the children to build a prototype to solve the problem in the story.

**Presentation & Test**

Ask the children to present their solution for the problem in the story. Then allow them to ask questions and give feedback to each other. Some challenge suggestions also have a competitive element. You can use this moment to see who has won.

**C**  
Character

Every challenge sheet introduces a character with a wish, that runs into a problem that hinders them from reaching their goal.

**P**  
Problem

The challenge sheets give suggestions for these three story elements for you to turn into a story for the children. You can elaborate or change the story as you see fit. By introducing the challenge in this story structure, you help the children imagine what they need to consider when they are coming up with a solution.

**G**  
Goal

After telling the story, you can help them to do so by helping them to specify: what, where, when, who, and how.

**Suggestions**

The challenge sheets also give suggestions for how you could organise the activities, or in what direction you could steer the kids' solutions.

# Workshop 3: Who can build the safest bridge?

Competition



**Preparation**

Prepare two bricks or stones to act as river banks for the children to build their bridge across.

**Story**

Use the suggestions to create a story for the challenge. You could also make the story about having to cross the 'river' with their toy car.

**Prototyping**

Give the children the chance to collect materials and ask them to prototype their solution for the problem in the story.

**Presentation**

Ask the children to present and test their way of getting across the 'river' one by one. Give them the opportunity to give feedback to each other.

**Options**

You could challenge the kids: who can build the best bridge?  
or  
Give an open-ended story: in what way can you cross the river?

- C** A girl is walking to the next village with her new shoes on
- P** There is a river but she wants to keep her shoes dry
- G** Help her get across the river without getting her shoes wet

**Suggestions**

You can use two big bricks to act as the river banks for the kids to build a bridge across. Additionally, you could use something as a weight to test if the bridge is 'strong enough' to support their toy car.



## Workshop 4: Who can make a water-ready boat?

Competition



### Preparation

Prepare bottles, some wood and stationery for the children to use to make their boats.

### Story

Come up with a story for the challenge and let the children discuss the topic to define the goal

### Prototyping

Let the children build their prototype for the ship.

### Presentation

Let the children present and test their ships one by one.

### Options

Organise a competition for what boat stays afloat longest, gets furthest and put that in the story.

or

You could also let the children focus on how they make the boat look.

- C** A man wants to sail across the lake to visit his family on the other side
- P** He doesn't have a ship to reach the other side of the lake safely
- G** Get to the other side of the lake without having his boat sink to the bottom

### Suggestions

Find some place where the kids can test their boat for water-readiness and to do the final showdown.

With the help of some creativity, empty bottles can be transformed into the hull of a ship.



15

## Workshop 5: How can we transport things and people?

Challenge



### Preparation

Prepare some materials to illustrate the problem and what they could build to solve it.

### Story

Come up with a story for the challenge and ask the children to discuss the topic to help them define their goal.

### Prototyping

Let the children collect materials and ask them to prototype their solution for the problem in the story.

### Presentation

Give the kids the opportunity to present their design, and the others to ask questions and give feedback.

### Options

You could talk about railways, trains, ships and other means of transport and let them prototype those.

or

Give a more open-ended story and allow the children come up with their own solutions.

- C** The mayors of two cities want to increase the transport of goods between their cities
- P** There is no way for people and goods to go from one city to the other
- G** Connect the cities in some way for people and goods to be transported

### Suggestions

This challenge may lend itself more to drawing out solutions. You could also give them the tools to draw their solution first and afterwards prototype it in other materials, such as clay or wood.



16

# Organising more workshops: How can we ... ?

Challenge



## Preparation

Prepare the materials that you intend the children to use during the workshop.

## Story

Come up with a story for the challenge and ask the children to discuss the topic to help them define their goal.

## Prototyping

Let the children collect materials and ask them to prototype their solution for the problem in the story.

## Presentation

Give the kids the opportunity to present their design, and the others to ask questions and give feedback.

## Options

It helps to give the children a story with a clear problem for them to discuss and solve.  
The materials you make available to the children greatly influence what the children might come up with as a solution.



Create a relatable character in a relatable context for the children



The problem should have a prototypable solution for the kids



The character's goal helps the kids identify the most important factors

## Suggestions

You can use the same workshop structure to help the kids to come up with solutions for problems in their own surroundings as well.  
This can motivate the children to use their newly acquired skills and practice them even more.

# Appendix 4 - Final Concept: Recruitment Videos

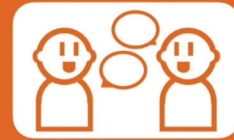
## Video 1

Do you want to join an  
SRI design workshop?  
It's a lot of fun!

We use our creativity to  
solve fun challenges,  
like designing a toy car

Let's design a  
toy car!

SRI design challenge 1



First we discuss the topic  
and decide how we will  
take on the challenge



and then we start  
making a prototype



## 9. Appendices

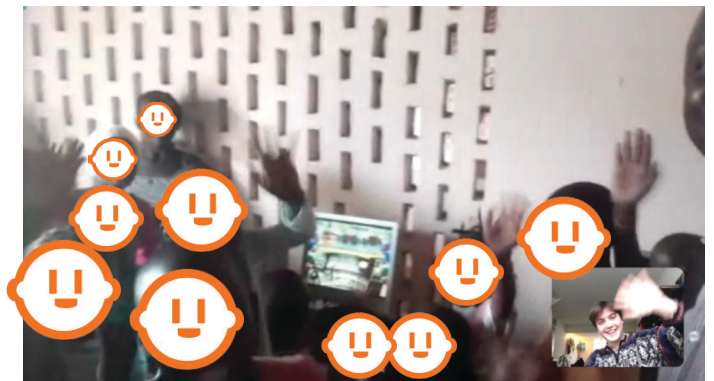


Finally, we present our designs to each other!



It's a lot of fun to create something yourself!

We hope to see you soon!





## 9. Appendices

### Video 2

Do you want to join an  
SRI design workshop?  
It's a lot of fun!

We use our creativity to  
solve fun challenges;  
last time we designed  
buildings!



First we discuss the topic  
and decide how we will  
take on the challenge



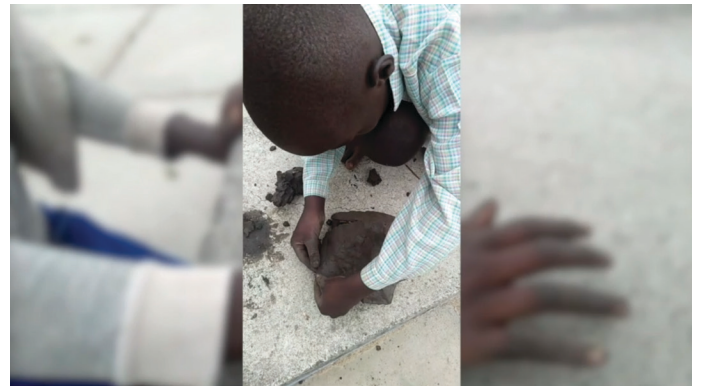
And then we get some  
material to work with



## 9. Appendices



and then we start making a prototype



Finally, we present our designs to each other!

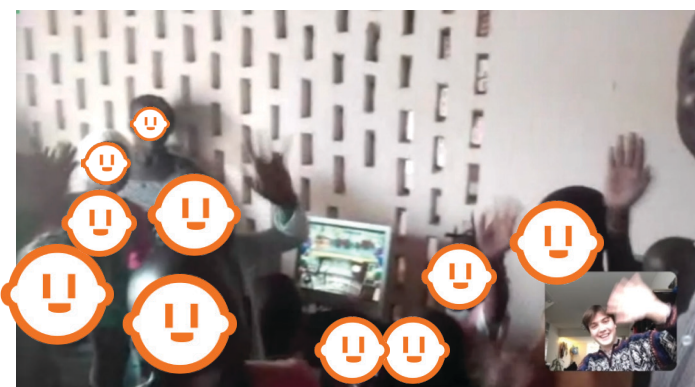


## 9. Appendices

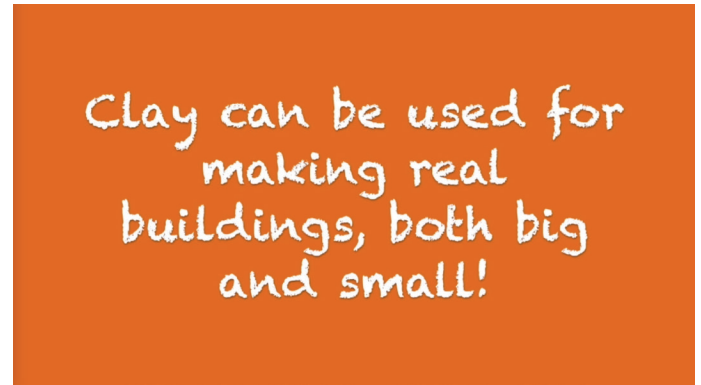


It's a lot of fun to  
create something  
yourself!

We hope to see you  
soon!



# Appendix 5 - Final Concept: Storyboard Workshop 2 Video



## 9. Appendices

There are many different kinds of buildings that are used for many different purposes

What kind of buildings can you think of?



**Pause the video and discuss**

Did you think of buildings for living, working, and studying? Maybe you even thought of buildings that are used for other things!

Now, imagine you're an architect and you get to design a building in your village

What kind of building would you like to build in your village and why?



**Pause the video and discuss**

When you know what the building will be used for, the next question is:

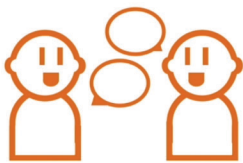
Who are going to be using the building?



Pause the video and discuss

As the architect, you have to make sure people can use the building as intended

How will you design the building so that people can use it as intended?



Pause the video and discuss

Do you have an idea of how you could make the building now?

Last time I gave you some examples, but this time you have to decide how you will make your prototype

So, let's get started!

# Appendix 6 - Facilitator Guide Workshop 2

## Let's design a building! - supplement to video 2 SRI Design Challenge 2

### Goal

This second workshop challenges the children to design a building. The workshop follows the same structure as the first challenge, in which they designed a toy car. However, the challenge in this workshop is more open-ended. In the first workshop, the video showed the children examples of how they could make several specific car parts out of clay, but this time the children have to decide on the way they solve these practical problems themselves. By giving a challenge with a bigger solution space to the children, they not only practice their creativity in regards of aesthetics or personal expression, but also in how they solve an overarching problem and overcome practical constraints.

### Recruitment & Preparation

When approaching the children to join the workshop, you can use the recruitment video to show them what they can expect from the activity, and of course how much fun that is! In preparation of the children coming to SRI, prepare snacks and drinks, as well as the tools they might use when working with the clay.

### Part 1 - Video & Discussing Questions - 20 -25 minutes

When the children are gathered around show the video for Workshop 2. It introduces several questions for the children to discuss. These questions help them think about the aspects of the design they should consider. By discussing they formulate their design goal for this workshop.

- Show the video to the children.
- When the video prompts a pause, pause the video and let the children discuss the question that was asked in the video.
- After giving the children some time to discuss the question, unpause the video and continue until the next time the video prompts a pause.



Part 1 - Video & Discussing Questions

During the discussion sessions, you can help the children by asking more questions and giving examples to help them elaborate their ideas and opinions.

### Part 2 - Designing and Prototyping - about two hours

- Once the video is done, let the children collect the materials they want to use for prototyping the building (clay, twigs, wood, or whatever they come up with).
- Let them 'prototype' the design of their building.
- While the children are working on their designs, you can help them by repeating the questions asked in the video to help them make their goals explicit:
  - What is the purpose of your building?
  - Who is going to use it?
  - How is it going to be used?



Part 2 - Designing and Prototyping

## 9. Appendices

- Where is it going to be located?
- What is it going to look like?
- While the children are working on their designs, arrange a table for the children to present their design in front of the others, in preparation of the next part of the workshop

### **Part 3 - Presentation - a few minutes per child, about half an hour in total**

- The children take turns with presenting their design in front of the others. In the presentation ask the children to explain:
  - Why did you want to build this?
  - What purpose does it have?
  - How and why did you make it like this?
  - What makes this special to you?
  - If you were to change something about your building, what would you change?
- After the presentation moment, first let the other children ask questions that might have arisen from the presentation. Then help the children give feedback to the presenter.
  1. What did they like about the design?
  2. What do they think could be improved?
  3. How can that be done?



Part 3 - Presentation

### **Part 4 - Final Video - a few minutes**

- The video concludes the workshop and congratulates the children with finishing the design challenge.



Part 4 - Final Video



# Appendix 7 - Original Design Brief

DESIGN  
FOR OUR  
future



## IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

**! USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT**

Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

### STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief\_familyname\_firstname\_studentnumber\_dd-mm-yyyy". Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !



<p>family name <u>Westerhof</u></p> <p>initials <u>M.B.</u> given name <u>Marten</u></p> <p>student number <u>4442725</u></p> <p>street &amp; no. _____</p> <p>zipcode &amp; city _____</p> <p>country _____</p> <p>phone _____</p> <p>email _____</p>	<p>Your master programme (only select the options that apply to you):</p> <p>IDE master(s): <input type="radio"/> IPD <input checked="" type="radio"/> Dfi <input type="radio"/> SPD</p> <p>2<sup>nd</sup> non-IDE master: _____</p> <p>individual programme: <u>- -</u> (give date of approval)</p> <p>honours programme: <input type="radio"/> Honours Programme Master</p> <p>specialisation / annotation: <input type="radio"/> Medisign</p> <p><input type="radio"/> Tech. in Sustainable Design</p> <p><input type="radio"/> Entrepreneurship</p>
--	---

### SUPERVISORY TEAM \*\*

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair	<u>Annemiek van Boeijen</u>	dept. / section:	<u>HCD / DA</u>
** mentor	<u>Mathieu Gielen</u>	dept. / section:	<u>HCD / DCC</u>
2 <sup>nd</sup> mentor	<u>James Otieno Jowi</u>		
	organisation:	<u>Sustainable Rural Initiatives</u>	
	city:	<u>Okana</u>	country: <u>Kenya</u>

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..



Second mentor only applies in case the assignment is hosted by an external organisation.

comments (optional)

⋮



Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.


## 9. Appendices

### Procedural Checks - IDE Master Graduation

#### APPROVAL PROJECT BRIEF

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

Digitally signed by Annemiek van Boeijen - IO  
Date: 2020.09.11 12:07:08 +02'00'



chair Annemiek van Boeijen date 11 - 09 - 2020 signature \_\_\_\_\_

#### CHECK STUDY PROGRESS

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

Master electives no. of EC accumulated in total: 46 EC  
Of which, taking the conditional requirements into account, can be part of the exam programme 31 EC

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

YES all 1<sup>st</sup> year master courses passed

NO missing 1<sup>st</sup> year master courses are:

name C. van der Bunt date 14 - 09 - 2020 signature \_\_\_\_\_

#### FORMAL APPROVAL GRADUATION PROJECT

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

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

Content:  APPROVED  NOT APPROVED

Procedure:  APPROVED  NOT APPROVED

comments

name Monique von Morgen date 29 - 09 - 2020 signature \_\_\_\_\_

## 9. Appendices

A toolkit for kids in rural Kenya to develop design skills by designing toys project title

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

start date 10 - 09 - 2020

20 - 02 - 2020 end date

### INTRODUCTION \*\*

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

The aim of this project is to create a toolkit that allows kids in rural West Kenya to playfully develop skills associated with design such as analytical ability and creativity. At Sustainable Rural Initiatives' community center (SRI) in Okana, West Kenya, kids will learn how to design toys. SRI is an organisation that aims to offer the local children, youth, adolescents, and adults of Okana a place to come together, offering sports and education to develop their academic skills, and practical skills such as woodworking and tailoring to tackle local issues. Other examples of SRI's work are collaborating with government institutions to educate them on (reproductive) health, sustainable agricultural methods, hosting exams and sporting events for local schools, and providing a library, woodworking, and tailoring space for local people to enjoy.

Toys are an opportune medium as they have an important role in play and are motivating for the kids to develop. Play is an important part of how kids develop and make sense of their surroundings. Through play, children explore and learn the rules and symbols of their communities (Eise 2009, pp. 44-45). Toys can also be translated into design assignments with relatively low complexity. During play, these kids often already make their own toys from things they find around their homes' surroundings, for example, toy cars and phones out of twigs and clay. With the help of the community center's employees locals can learn e.g. woodworking and tailoring at SRI's facilities. Another reason for the kids to design toys is the cultural implications of the toys the kids play with. Through play, children recreate roles and situations that reflect their sociocultural world, where they learn how to subordinate desires to social rules, cooperate with others willingly, and engage in socially appropriate behaviour. Over time, these competencies are transferred to children's everyday behaviours' (Fisher 2011, p. 348). Toys that are designed in and for other cultures are not necessarily unsuitable or undesirable for kids in other contexts to play with. However, it could be beneficial for kids to play with toys made in and based on their own surroundings, making use of e.g. unique local inspiration, materials and in turn carry local values. An important factor during this project, and the final design that comes from it, are thus values that dictate the way such an educational tool is designed and intended to be used. It is important to be aware of the cultural and individual values held by the designer and the people being designed for. It is an opportunity in this project to compare these values and investigate best practices for projects in similar situations.

The main target users and stakeholders in this project are the kids and the teachers / supervisors at SRI who will guide them through the process. It is aimed at kids attending elementary school in the age bracket of 6 - 12 years old. For this project's final result it is thus of great importance to get in contact with these kids, their surroundings, and educators. The community center and the people who work there are to play a complementary role to the kids' education in parallel to their regular school curriculum. They are key stakeholders as they will be the ones facilitating the kids in their design process, teaching the kids skills related to the fabrication of their toys with the tools available in the community center. Other local educators at elementary schools are considered experts in what skills are valuable for these kids and in how they can be taught those skills. James Otieno Jowi is the stakeholder representing Sustainable Rural Initiatives in Okana, Kenya.

space available for images / figures on next page

## 9. Appendices

### Personal Project Brief - IDE Master Graduation

introduction (continued): space for images



image / figure 1: SRI's community center

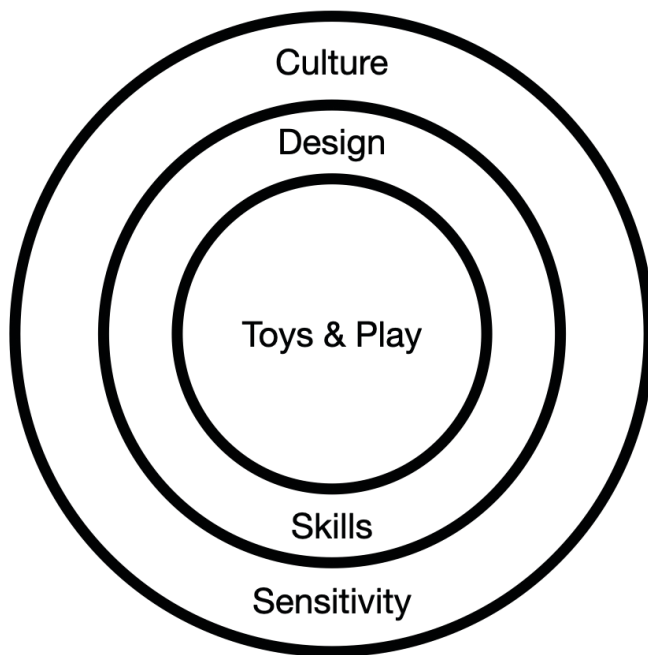


image / figure 2: Core topic of this project and the layers around

## 9. Appendices

### PROBLEM DEFINITION \*\*

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

Children in Okana, Kenya, and similar rural areas can benefit from learning at an early age how to use design thinking and skills to integrate different wishes and dreams they hold into something tangible. Based on the conversations with SRI, there is a desire to teach kids design skills, but there is a gap in knowledge on these skills and on how to transfer these skills to the kids. The challenge of this project is thus to design something that allows these kids to learn and practice design skills. Toys seem to be an opportune medium for the kids to practice designing themselves. The final design should take the possibilities and limitations of the SRI's community center into account. And so part of the problem definition becomes: finding out how designing toys for their own cultural context can be facilitated.

### ASSIGNMENT \*\*

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

Research toys and play in the local context of rural Kenya, playful education and teaching design skills to kids, as well as culture-sensitive design. By doing (proxy) research with the kids in SRI's community center I will map the wishes and requirements they have that are then integrated in the final toolkit that can be used at SRI to teach kids design skills.

The goal of this project is to create a solution for teaching kids design skills in a playful way by designing design simple toys. Toys are an opportune medium for this as they have an important role in the play of kids and are interesting as subject matter for the kids. Another reason for this project is for these kids to be able to play with toys that have cultural significance in the rural Kenyan experience. These kids can then be the designers for these new toys, to increase the ownership and relevance of their toys. This can in turn lead to a positive role in the shaping of their identity, both personally and culturally.

The to be designed tool should take into account what the kids need to learn to be able to design toys that can be prototyped and fabricated at the community center.

The main themes that should be investigated and integrated in the final design are:

- A. Toys and Play: What is the meaning and value of toys in the targeted context? How do kids play and learn?
- B. Playful Education of Design Skills: How can children learn to design their own toys in a playful way?
- C. Culture-sensitive design: How to take the cultural context into account during the design process and in the design of educational tool?

# 9. Appendices

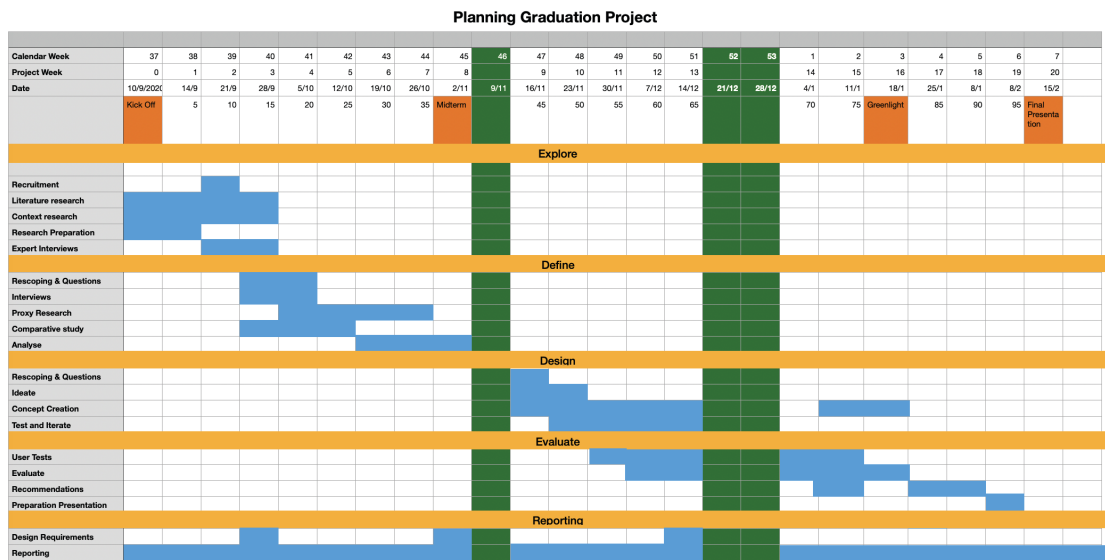


## Personal Project Brief - IDE Master Graduation

### PLANNING AND APPROACH \*\*

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

start date 10 - 9 - 2020 20 - 2 - 2020 end date



The first phase 'Exploration' will consist of a general study about how and with what kids play, the context SRI operates in and the cultural context of Kenya. The Cultura-method is a valuable starting point in mapping out what role and status do education and play have in Kenya (Hao, van Boeijen, & Stappers, 2019). This will in turn be used for making a comparative artefact analysis of toys in the Netherlands and East Africa and Kenya; the difference in play and the cultural aspect of play is an important underlying factor in this project. How does this affect development and the forming of identity? Additionally, a literature research about design education programmes for children, playful design educational toys and design for different cultural contexts. already existing design education tools and programmes specifically for children and will be done, in combination with dialogue with educators both here and in Kenya to make an overview what skills are most beneficial to the kids' development. Ways of harnessing play as an educational tool will be researched (e.g. De Valk et. al. 2012; Weisberg, Hirsh-Pasek, & Golinkoff,(2013), Weisenberg et. al. 2016). In the 'Define' stage I will map these findings into an overview that incorporates the findings in regards to cultural values, necessary skills of the kids and preferable educational methods of the tool into a list of requirements for the final design.

During the 'Design' phase, concepts for the tool will be developed. The content of the tool, what skills will be taught to the kids, and the didactic methods through which this will be done. It will be key to iteratively explore ways to collaborate digitally and try out different ways of organising such an education programme.

In the final stage this will all be concluded in a final design that will be evaluated based on which a recommendation for implemented by SRI in their community center will be written.

### MOTIVATION AND PERSONAL AMBITIONS

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

My main ambition for this project is to make a meaningful contribution to SRI. The education tool would give kids a valuable pastime at the community centre through which they develop diverse valuable skills. I deeply believe that the merit of this project is to support kids to explore and develop themselves by a creative approach; helping them to find their own interests, ways to be creative, and letting them flourish. Educating myself about this further to expand my knowledge and immediately apply to this project seems like a beautiful challenge. In addition to that, I am very excited to learn about culture-sensitive design and collaboration, and in addition develop myself by learning from the cultural differences that might become apparent during this project. Because of the current unpredictability around the developments of COVID19, it is unlikely that I will be able to travel to Kenya for field research. Other ways of collaborating with the kids and people at SRI as well as ways of doing research of the context are key to the success of the project. Using and reflecting on doing research in this way are thus also an integral part of the project. The most apparent ways of collaborating is video calling with the children, the other stakeholders and experts. Additionally the kids can make videos of their surroundings and vlog about their lives and how and with what the kids tend to play. Another way of collaborating is to create co-creation exercises that are done together with people at SRI and the kids, or if that proves impossible asking the people at SRI to be intermediaries for doing the co-creation. Ideally, I would like to translate the findings of this project things into useful principles about creating educational design tools that could be interesting to further research and publish, with the horizon set at eventually working towards a PhD position. To conclude, a good end result will be an individual project, well reported, and with integrating personal interests and values to elicit positive change.

#### References:

- De Valk, L., Rijnbout, P., Bekker, T., Eggen, B., De Graaf, M., & Schouten, B. (2012, July). Designing for playful experiences in open-ended intelligent play environments. In IADIS international conference games and entertainment technologies (Vol. 310, p. 318).
- Else, P. (2009). The value of play. Bloomsbury Publishing.
- Fisher, K., Hirsh-Pasek, K., Golinkoff, R. M., Singer, D. G., and Berk, L. (2011). Playing around in school: Implications for learning and educational policy. In A. D. Pellegrini (Ed.), Oxford Handbook of the Development of Play. Oxford University Press.
- Hao, C., van Boeijen, A., & Stappers, P. J. (2019). Cultura: A communication toolkit for designers to gain empathic insights across cultural boundaries. Design Discourse on Culture and Society: Re: Research, Volume 5, 5, 3.
- van Doorn, F., Stappers, P. J., & Gielen, M. (2013, April). Design research by proxy: using children as researchers to gain contextual knowledge about user experience. In Proceedings of the SIGCHI conference on Human Factors in Computing Systems (pp. 2883-2892).
- Weisberg, D. S., Hirsh-Pasek, K., & Golinkoff, R. M. (2013). Guided play: Where curricular goals meet a playful pedagogy. Mind, Brain, and Education, 7(2), 104-112.
- Weisberg, D. S., Hirsh-Pasek, K., Golinkoff, R. M., Kittredge, A. K., & Klahr, D. (2016). Guided play: Principles and practices. Current Directions in Psychological Science, 25(3), 177-182.

### FINAL COMMENTS

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