CHILDREN AS CO-RESEARCHERS IN DESIGN

ENABLING USERS TO GATHER, SHARE AND ENRICH CONTEXTUAL DATA

FENNE VAN DOORN

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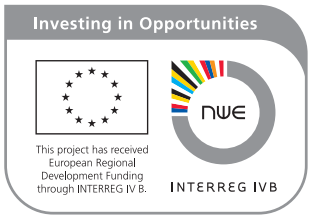

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Co-researcher (9 years old)
"What do you like to do at the school-yard during the break?"

Participant (her best friend)
"I really like it when you and I sit together at the top of the climbing frame and look down at the children playing on the ground. We look at what they are playing and try to play the same thing but on the climbing frame instead."

This quote comes from a case study in which children acted as co-researchers by interviewing their peers. It gives the feeling that the participant trusts the co-researcher, because she is her best friend, and that the co-researcher can relate to the answer the participant gives, because it is something they do together. This quote gives a small peek into the world of the two children and inspires me as a designer to come up with ideas for playground concepts. This quote also inspires me, as a design researcher, to harvest user insights from conversations between peers.

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CHAPTER 1 – INTRODUCTION

1.0 INTRODUCTION

The research in this thesis investigates how users can play an active role in research related activities within design processes. User research, understanding the context and values of users, has become an indispensable part of the design process. Next to that, user involvement in the design process increases. This thesis explores the combination of the two: giving users the role of user researcher.

The last decades, design is growing from developing physical products into solving complex social issues (Yee at al., 2013). In order to understand the complexity of these issues and the dynamics at play before implementing a solution, designers perform insight-generating activities to inform concept development (Sanders & Stappers, 2014). Complex societal problems have multiple stakeholders and the outcomes of design projects can consist of a variety of forms. An example of such a complex design project that involves different stakeholders (e.g. children, teachers) and results in a variety of outcomes (e.g. landscape design, playground equipment) is described below.

Example project – Green school-yard

A school in the city centre of Delft wants to develop a new "green" school-yard that motivates children to become more active during their lunch break. Many people will interact with this new school-yard. Next to pupils of different age groups, parents visit the school-yard when they bring their children to school and teachers stay at the school-yard when they supervise the children and gather them at the end of the break. A daycare centre, which also provides after school care for older children, uses a part of the school-yard as well. The municipality also wants the school-yard to be open after school hours for the children in the neighbourhood. One could consider all these people who make use of the school-yard as "users".

To understand how these users experience the school-yard now and what their needs and wishes for the future school-yard are, they are involved in user research. The kind of data you get when involving users at the start of such a design project is for example the quote about the school-yard at the first page of this thesis. This quote gives insight in the experiences of children and inspires new ideas for the school-yard.

The outcomes of this design project might be: the structure of the space, natural elements like trees, bushes or rocks, playground equipment, a system to manage the different groups of children going to and from their break, toys the children can use on the school-yard and the way everything is connected.

1.1 RESEARCH AS AN ELEMENT OF DESIGN

Design projects are often complex, partly because design teams are looking at increasingly large domains (Yee at al., 2013). They no longer consider for example the design of a swing, but societal issues like improving the social cohesion in a neighbourhood, or fighting obesity amongst children. Outcomes can take many forms, like physical products, city planning, educational programs etc. These outcomes may include a swing, but typically as part of a larger scheme.

Because product design changed from focusing on physical products towards problem solving in social issues through interaction, service and experience design, designers need to get insight in complex matters in order to design solutions. Consequently, research activities have become an important element of the design process.

This is also noticeable in the university based design curricula that include scientific theory and research skills. Research competencies are part of both bachelor and master education at, for example, Industrial Design Engineering, Delft University of Technology (see: Assessment report of the IDE faculty's educational programmes (2013)).

Complex design projects deal with large amounts of constantly changing information. Therefore, multiple experts from different fields contribute their own expertise to the design process, while respecting and building on the expertise of others. One of these experts is the user (Sleeswijk Visser et al., 2005).

According to Sanders & Stappers (2014), the past decades users are getting more influence in the design process. Next to evaluating design concepts, through usability and prototype testing, users also inform earlier stages of the design process through, for example, focus groups or generative techniques (Sanders & Stappers, 2012). Users are seen as 'experts of their own experience' (Sleeswijk Visser et al., 2005) and by sharing their routines, wishes, needs, dreams and fears they provide contextual knowledge about what would best serve their needs.

This thesis focuses on user research in an early phase of the design process, which aims to get an understanding of the lives, wishes and needs of users in order to inform and inspire designers and to feed the design process from the start of the project with user insights.

Since I am focusing on the area of design in which an end result is often not defined yet, it is hard to indicate specific users. When I talk about users in this thesis I mean people with first hand experience relevant to the intended situation of use. In the example project on page 6 users are, amongst others, the children and teachers.

1.2 INCREASED INVOLVEMENT OF USERS

The user takes on a variety of roles in the design process and collaborates in activities that were previously conducted exclusively by the designer. Von Hippel (2005), for example, suggests that certain 'lead' users can innovate need-specific products, services and software themselves. He challenges the traditional model in which a user's only role is to have needs and proposes a user-centric system of innovation in which lead users that are characterized by being 'frontrunners' deliver concepts and play an important role in product innovation.

According to Atkinson (in: van Abel et al., 2005), with the rise of easily accessible digital tools, everybody can be a designer, especially in the field of graphic design and ICT. But also in product design people can use the Internet, 3d-printing and for example social-funding, to share, model and print their own products. Some designers promote open design, in which designers share their knowledge and become a facilitator, co-designing with users (e.g. Cruickshank, 2014).

There are opponents of the idea of "users as designers" as well. Some designers and design agencies emphasize that designers have necessary skills users do not possess. Because of the intuitive nature of innovation they regard participation of users as literally "useless". Even though the author has heard this statement, no scientific articles were found that support this argument. There are blogs that endorse this viewpoint, see for example the web article of Danish designers Skibsted and Hansen "User-led Innovation can't create breakthroughs; Just ask Apple and IKEA." More about participatory and co-design can be found in chapter 3. In this thesis I take the provisional standpoint that users can have a role in design and I will further investigate what kind of role this is.

USERS INVOLVED IN RESEARCH ACTIVITIES IN DESIGN

Next to the role of designer, users can take the role of researcher in the design process as well, letting them collaborate in activities that used to be conducted exclusively by the user researcher. The terms 'research' and 'design' need some clarification, because both are used with a variety of different meanings in design literature and practice.

For the design projects this thesis studies, the Double Diamond model (UK Design Council, 2005) is a helpful framing. The model structures the design process as a whole in four successive steps: discover, define, develop, and deliver. The first step (discover) corresponds to the research activities undertaken to understand the context of use, the second (define) to the formulation of a design vision, built on that research. The third step (develop), is concerned with ideation and conceptualization, whereas the final step (deliver) is concerned with prototyping and implementation.

In literature, the term 'design' is often used to indicate only the third step (actually, often when people reproduce the Double Diamond diagram, they label the third step as 'design' instead of 'develop'). In most studies that report on letting users design, this mostly means ideation of solutions.

The labelling problem is not easily solved; the literature on New Product Development uses the label 'development' not for the third step, but for the whole process. In this thesis I use the term 'research' to mean the first step, and 'design' in the narrow sense for the third. Similarly, Sanders & Stappers use the term co-design to indicate "collective creativity that is applied across the whole span of a design process", setting it apart from "co-creation" at the smaller scale (such as 'mere' ideation).

Another issue with the model is that many processes, especially in an academic or arts environment, do not follow the above sequence, but often knowledge generation and solution generation are tightly connected and iterative. However, the model of separated phases fits for much that goes on in commercial design practice, and can therefore be regarded as appropriate for use in this study.

In this thesis I use the terms "research" and "design" on that small scale, i.e., "(co-)research" as the activity that looks at the world around the user, and generates knowledge (sometimes called 'User Insights') through selection, interpretation and generalization. On the basis of this knowledge and other considerations, such as the abilities of the company, a direction and vision are defined, which form the basis for "(co-)design", i.e., generating ideas, making choices and implementing solutions to place in the world.

There are more examples of users involved in ideation (e.g. Jansen et al., 2013, Kanstrup, 2012, Lozanovska & Xu (2013)) than in the research related activities in the design process. However, some projects were found in which users (sometimes unintentionally) carry out research related activities. These following examples show projects in which users performed as researchers for a variety of reasons:

Richness of data
McSeveny et al. (2013) describe the use of the virtual world "second life" to encourage physical activity in an older population. The researchers interviewed friends and family within the prescribed age group to find out what features of a virtual world would appeal to them. After the interview, one of the participants could not let go of the subject and asked the same questions to a group of her friends. She wrote down their answers and told them to the researcher on the phone. The researcher was surprised by the richness of the data the participant gathered. The participant knew the group of friends she interviewed for years and she could link their answers to other aspects of their lives, delivering a rich context.

Richness of data
Bekker et al. (2003) describe the use of a technique they call "Kid Reporter" to gather user requirements for a game in a zoo in Amsterdam. In this research children collected data inside the zoo in Amsterdam by conducting interviews, taking photographs and writing an article in order to make a newspaper about the zoo. The insights the children reported were used as inspiration for an interactive game for children that can be used in the zoo. Bekker et al. report that: "The children provided more detailed information than when the researchers asked the information from the children separately. Being allowed to make up their own questions for parts of the interview allowed them to tell the story they wanted to tell." According to Bekker et al., the information helped the designers to gain knowledge

about the verbal and reasoning skills of the age group of the involved children and allowed them to make more informed decisions in the design process.

Access to participants
Pries et al. (2012) describe the design of a new on-board crew rest for flight attendants. The design process started with user research. It turned out to be hard to do research with flight attendants due to them being constantly on the move and the strict rules on safety in airplanes. Therefore, the research team used flight attendants and a pilot to do research with their peers during flights.

Reduction of time and costs
van der Lugt (2007) was asked to do a design research project for a company, which was limited in time and budget. So the question came up: how could he reach a wide variety of people without him having direct contact with everyone and still end up with rich information and insights? Co-researchers were selected from the companies' personnel to help in the research. They received research packages, which helped them to conduct three interviews with peers.

Trust
Singh (2011) describes the value of collaborative videoing in a project in an urban slum of India. At the start of this project Singh had problems gaining trust of the local community. When he helped members of the community to make their own video-documentary about their lives they opened up. This method led to trust in the researcher from the local community because they could decide themselves whom to interview and what to film with no external party involved. These example projects show that users have access to a group of peers with which they share a context and mutual trust. Offering users part of the responsibilities and skills of a researcher might lead to undiscovered user insights valuable for new innovations better serving their needs.

Until now, users mainly deliver insights in their lives in sessions led by researchers. In this thesis I will investigate how users can play an active role in research activities at the start of the design process, since the example projects show that involving users as researchers is a promising direction. The scientific purpose of this study is to develop knowledge about the ways contextual research can be done by inexperienced people in a familiar social atmosphere. My hypotheses are that users:

- can provide contextual knowledge to better execute the research set-up, conduction and analysis.

- can generate different content in conversations with peers than a researcher in conversation with participants, because peers trust each other and they speak the same language.

- can enrich data from peers by adding contextual information about shared experiences.

- can use their network to get access to peers; this makes recruitment of participants easier.

Challenges of involving users as researchers to conduct contextual research with peers might be that they miss obvious information; they don't know what to ask or overlook important details because they share their context and experiences. Next to that, the translation of the data from the user to the researcher might be difficult; will the user understand what information is relevant? Will the co-researcher be an interfering factor obscuring the data? And finally, as a designer it is beneficial to get in contact with the target group directly, to build empathy and understanding (Sleeswijk Visser, 2009); is adding more persons to the chain going to be detrimental to the designer?

1.3 FOCUS ON CHILDREN

This thesis is part of the European 'ProFit' project, in which children are an important target group. I took this opportunity to focus this thesis on children as well. On the one hand this decision limits the study of users as co-researchers in general. On the other hand, children are an interesting group to work with. In my experience, they are often more direct and less nuanced in showing their enjoyment or lack of interest than adults. Next to that, children are used to do assignments in a school environment, making them less hesitant than most adults to do assignments in case studies. There are also difficulties; for example it might be hard for children to express contextual insights since they don't have a lifetime of experiences yet.

Just as adults, children have their own wishes and needs and it is important to keep those in mind when designing products and services aimed at them (Dedding et al., 2013). Children's experiences and thoughts are valuable input in the design process to ensure the end product fits their needs (Druin, 2002). When children are involved in the design process they are often asked to perform activities like brainstorming, drawing ideas and making prototypes (e.g. Mazzone et al., 2013, Walsh et al., 2010, Guha et al., 2005). I expect that if children collaborate

in research activities their input can have added value because listening to children's conversations, without the direct interference of adults, can give an inspiring glimpse into their world.

1.4 RESEARCH QUESTIONS AND APPROACH

The design goal driving this research is:

"How can user researchers work with children as co-researchers to conduct contextual user research?"

The answer will take the form of an approach and guidelines for designers and researchers to give children the role of co-researcher in their own work. The research questions that derive from the design goal are:

- "What are the barriers and enablers for users to take the role of co-researchers?"
- "Does employing users in the role of co-researcher lead to rich user insights?"
- "What are implications on the design process when working with users as co-researchers?"

The "users" in the research in this thesis will mainly be children, with some exceptions. After conducting literature research about the role of users in the design process and co-research in other fields, a framework will be developed in the next chapters. More detailed research questions will follow from the framework.

APPROACH TO ANSWER THE RESEARCH QUESTIONS

Through a series of case studies a framework of knowledge about co-research and a method to work with children as co-researchers will be developed. Because this dissertation is about a new way of conducting contextual user research, it is explorative in nature. Case studies qualitatively investigate real-life situations and issues and problems therein. In these case studies, theory and knowledge is derived from the rich data gathered with small sized groups of participants.

Experience from each case study will be used as input for the next one. All cases will be analysed in a thematic way by examining data through open and axial coding and extracting core themes that can be distinguished both between and within case studies. Experiences from each case study, next to findings from other researchers and literature, will be used to further build and elaborate the framework. Sometimes I get the question if this thesis will deliver new ideas for playgrounds. The answer is no, this thesis will deliver ideas on how to gather user insights to help designers to come up with new ideas for (for example) playgrounds.

In doing this work it is easy to get confused between the three different levels of research. That is because I am doing research on doing research. ***Figure 1.1*** shows the three different levels I am talking about. In each case study I act as thesis researcher, and in some case studies (1, 3, 4, 5) as user researcher as well.

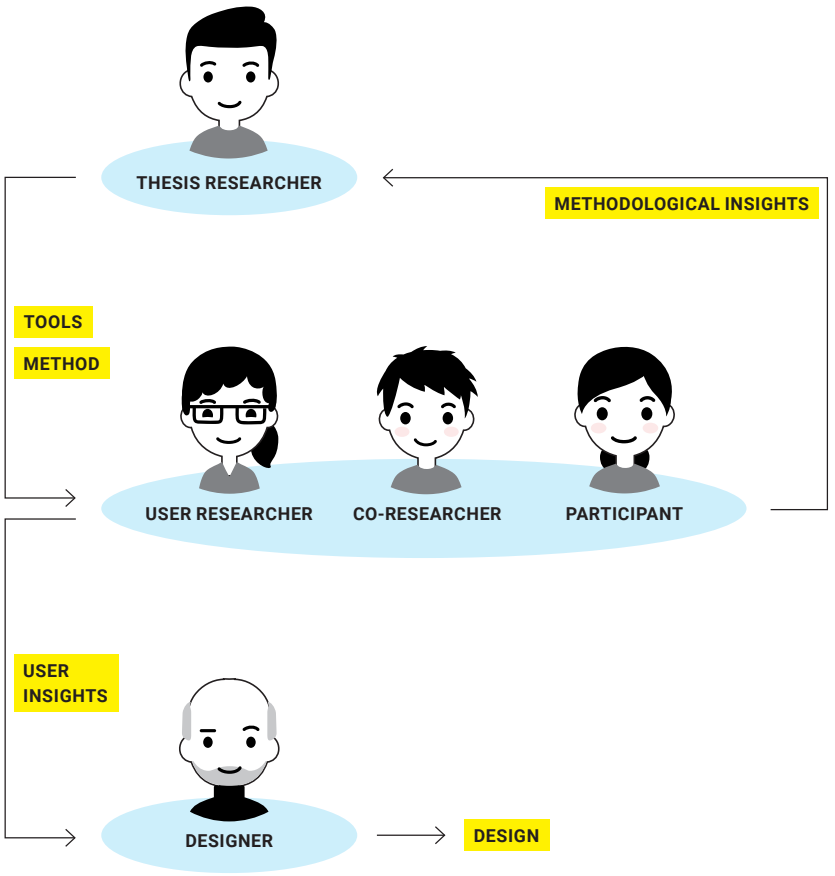


Figure 1.1 *The different levels or research in this thesis*

ETHICS

Ethical considerations are essential when conducting research with children, because it is an especially vulnerable target group. Therefore ethics in co-research will be part of the framework in chapter 4. In chapter 6 I will further discuss the ethical consequences and considerations of the co-research method and specifically employing it with children.

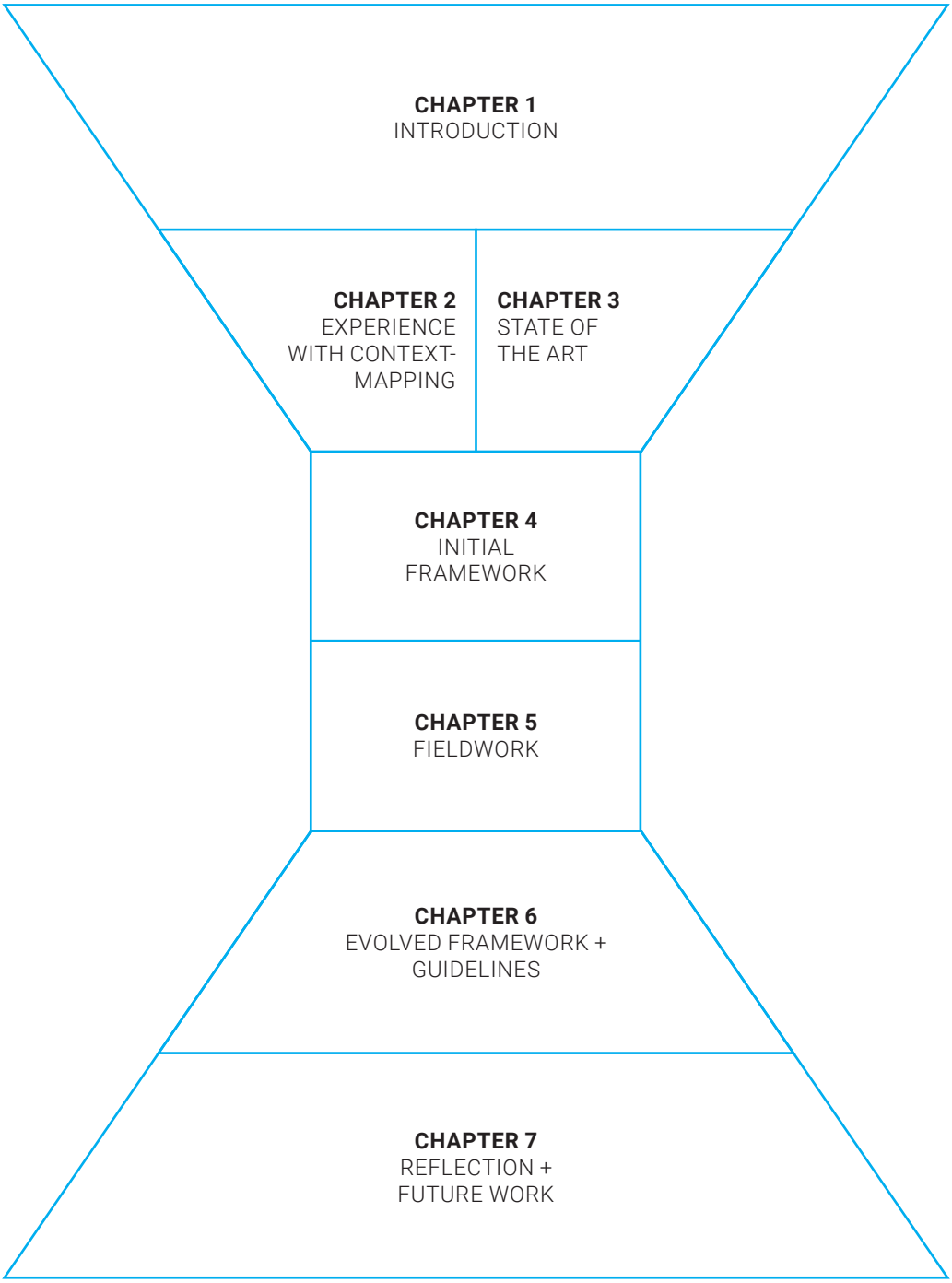


Figure 1.2 *Structure of this thesis*

1.5 REAL-LIFE IMPLEMENTATION

Five of the eleven case studies in this thesis are conducted within the "ProFit" project (www.fieldlabs.eu), funded by the European Union under the Interreg IVB North West Europe program. ProFit aims to stimulate innovation and new business creation in the sports sector by developing field-labs in Eindhoven, Delft (NL), Kortrijk (BE) and Sheffield (UK) and Belfast (UK). These field-labs are research and development locations where citizens (children, adults, elderly) engage in sports and play activities. Businesses can install new product prototypes or production models in the field-lab where the end-users can use and test them as part of regular sports activity.

The contribution of the research in this thesis to the ProFit project as a whole is to deliver user insights to set up fieldlabs and drive the innovations within the fieldlabs. Advantages of the ProFit case studies are that they involve real companies, users and situations from practice. A disadvantage is that I had limited freedom to set up the ProFit studies since there were many stakeholders.

In this thesis I will reflect on the co-research approach from the perspective of this practical project. Can the project benefit from a co-research approach? Which of the findings are actually used within Profit? These questions link this thesis to real life and test the societal relevance of this research.

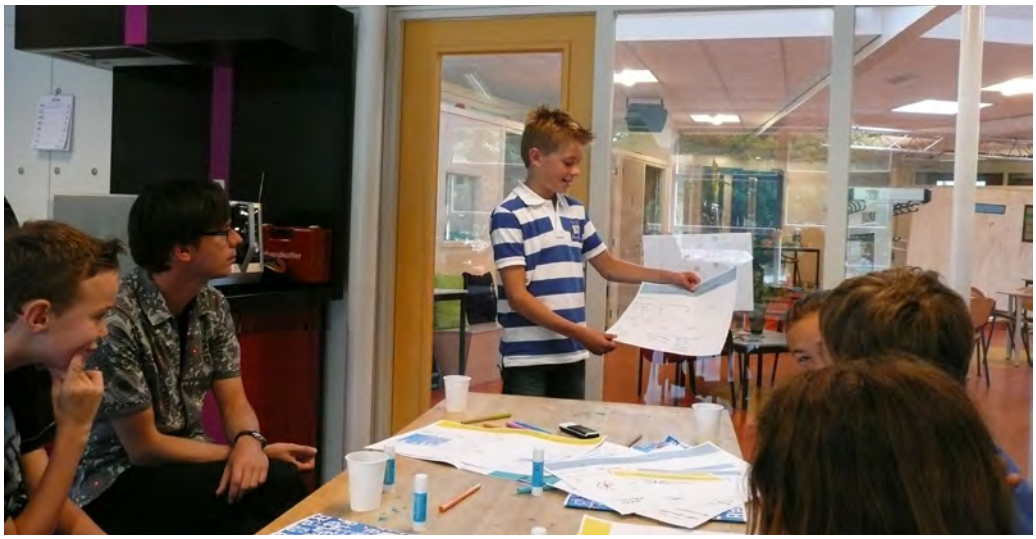
1.6 READING GUIDE

Figure 1.2 shows the structure of this thesis. A broad description of the field in the introduction (chapter 1), experiences in practice (chapter 2) and literature research (chapter 3) are combined in an initial framework (chapter 4). Through several case studies (chapter 5) insights are gained to develop the framework further (chapter 6). The thesis ends by looking at the broader perspective again in the discussion (chapter 7).

Design researchers and academics that want to get an overview of this thesis and understand its place in the landscape of design research can find this in chapter 3, the beginning of chapter 6 and chapter 7.

Design practitioners and ProFit partners can find case studies and guidelines on how to work with children as co-researchers in chapter 5 and the end of chapter 6.

CHAPTER 2 - FROM CONTEXTMAPPING TO CO-RESEARCH



2.0 INTRODUCTION

This chapter is partly based on the following publication:
van Doorn, F., Gielen, M., Stappers, P.J., (2014) Involving children and elderly in the development of new design concepts to become active together, Interaction Design & Architecture(s): 86-100.

This chapter describes hands-on experience with an established user research method and serves as a baseline for the exploration of co-research. This first-hand experience gives me the opportunity to find directions for co-research and to compare my work to the status quo.

When conducting the field-research in this chapter, the focus of attention is on the role of the user and on the question if the user is already involved in research activities. After that, I will investigate if activities originally partaken by the user researcher can be transferred to the user, hence finding opportunities for co-research.

In the next chapter I will discuss literature related to users in the role of researchers. The reasons to start with hands on experience before examining literature is that it gives me the freedom to explore opportunities myself with an open view and discover relevant perspectives before committing to one by adopting a theory. It also gives me support to form an opinion about findings in literature in the next chapter because these findings can be related to field experience. This approach relates to grounded theory (Charmaz (2003)) where theory is constructed after analysing data. Another reason is that the study allows me to build experience with working with children. In future studies this experience assists in differentiating between findings that are related to either the co-research approach or to working with children in general.

This chapter results in ingredients for the framework for involving users as co-researchers. These ingredients will be adjusted and supplemented by findings from literature in the next chapter.

2.1 THE RESEARCH PROCESS

Designers study the context of use to develop empathy with and get inspiration from users. These studies are sometimes referred to as contextual user research. It is a qualitative and design-driven form of research, which gives insight in the daily life, and experiences of potential users.

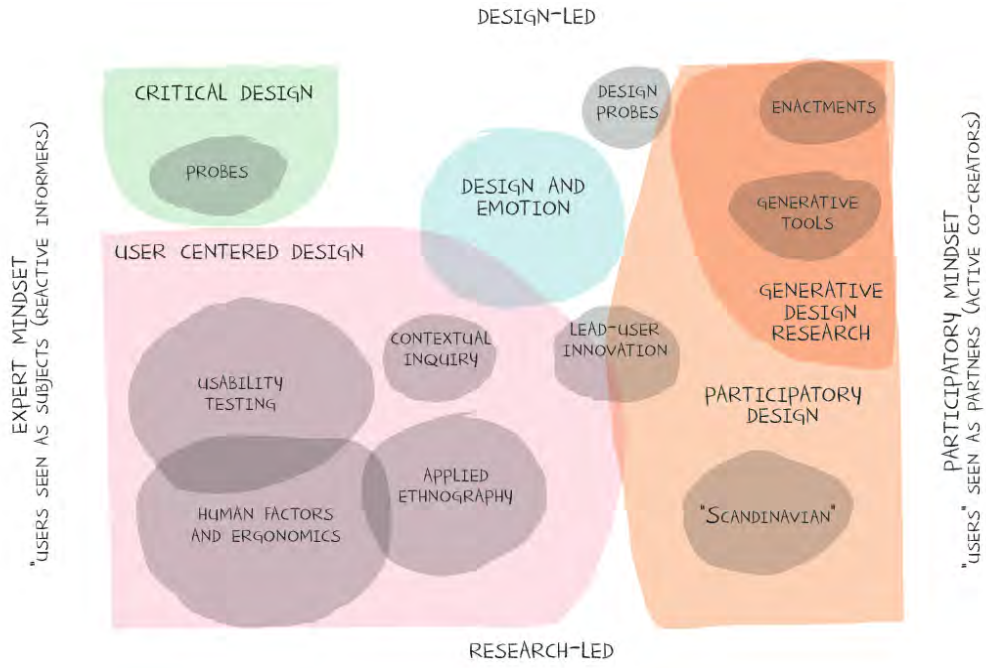


Figure 2.1 *Topography of Design Research from Sanders & Stappers (2012)*

Figure 2.1 shows a division of different design research approaches. The research in this thesis follows a participatory mindset and is design-led. So it can be placed in the upper right corner of the figure, building on generative design research. Contextmapping can also be positioned at the upper right corner because it makes use of generative tools (Sleeswijk Visser et al., 2005). Just as contextmapping, the research in this thesis aims to explore insights from daily life, experiences and dreams of the people who will be served through design. The contextmapping procedure is described in detail (e.g. Sanders & Stappers, 2012) and has been a subject of ongoing research. Contextmapping has been adopted in academia,

its original paper (Sleeswijk Visser et al, 2005) being cited over 400 times, in practice and education, making it an established method to compare my own work to.

Contextmapping
The basic principle of contextmapping is that users are 'the experts of their own experiences' (Sleeswijk Visser et al., 2005), but this expertise lies in deeper levels of knowledge, which users are not immediately aware of, is unstructured and difficult to convert into words. Generative techniques are used to guide participants in small steps through the process of accessing and expressing these deeper levels of knowledge. In contextmapping, participants first get a number of small assignments in which they observe and reflect on a certain topic in their lives during a couple of days (sensitizing). This is used as preparation for a group session or interview, in which they create expressive artefacts, and have a discussion about their considerations. Contextmapping builds on users' abilities to observe, reflect, and discuss their own experiences. Contextmapping is an open approach to collect stories that give insight in the experiences, dreams and needs of people. The textbook Convivial Toolbox (Sanders & Stappers, 2012) describes the principles and approach of contextmapping in detail. Originally, contextmapping has been developed at TU Delft for use with adults. Since then, it has been applied extensively and with a wide variety of user groups, including children (Gielen, 2013), elderly (van Rijn, 2010) and teens (Postma et al., 2006)

The general sequence of contextual user research is shown in ***Figure 2.2***. Each box in this figure comprises different activities. In the 'preparation' phase the research process is planned, questions are defined, materials are made and participants recruited. Activities within the 'gathering' phase are facilitation, data capturing and processing. During the 'analysis' phase, the data is interpreted and then communicated in the 'communication' phase. Finally the insights from the research are conceptualised in the 'conceptualization' phase, which is part of 'design' in this figure.

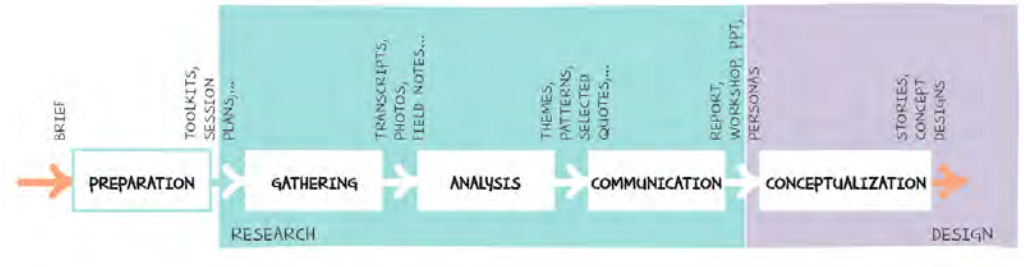


Figure 2.2 *The basic sequence from Sanders & Stappers, 2013*

This chapter describes a study that consists of several contextmapping studies with children and elderly. A study that consists of several studies might sound confusing to the reader. This is a consequence of the fact that I operate at two research levels. The "thesis research" level focuses on finding opportunities and challenges for co-research. At the "user research" level, user insights will be generated that aim to inspire companies to come up with new ideas. *Figure 2.3* shows the levels of research that are discussed in this chapter and the people performing as thesis researcher and user researcher. Notice that the co-researcher is not an actor in this study since we are searching for opportunities to bring in this role. The more practical "user research" is reported on in text boxes in this chapter. After describing the user research I will reflect on the case study on the level of the thesis research.

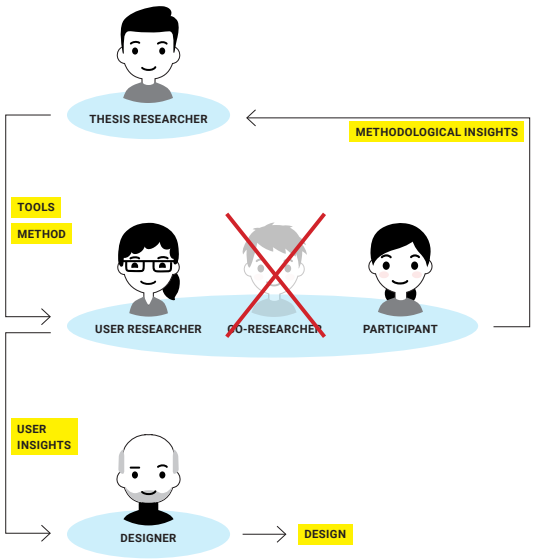


Figure 2.3 *Levels of research in this chapter: no co-researcher yet*

User Research for the ProFit project

The new FieldLab in Delft is located in-between an elderly home and blocks of family houses and has two primary schools located nearby. The municipality decided to focus the new FieldLab on children (8-12) and elderly (70+) together and turn it into an intergenerational movement park, since there is not enough space to facilitate outdoor recreation for children and elderly separately and because of the expected benefits from them interacting with each other. To find out about children's and elderly people's experiences with being active, their current and aspired interactions and wishes, fears and expectations for the new intergenerational movement park, several contextmapping studies were performed.

To ensure that the Fieldlab is seeded with working prototypes, a competition was organized to motivate commercial parties to develop a prototype. User needs from the contextmapping studies were presented to the competing companies. Five companies that design playground equipment or wanted to expand their market in this direction developed a design concept for social interaction and physical exercise in the intergenerational movement park.

User insights sought for

The aim of the contextmapping research, for the ProFit project, is to inspire designers to create new concepts to place in the FieldLab. To get insight in the needs, wishes and dreams of children and elderly for this shared space, with the focus on them being active together, the following user research questions were set-up:

- What role does "movement" play in the daily life of children and elderly?
- What are the interactions within and between these groups?
- What are their wishes and needs for being socially and physically active in the intergenerational movement park?
- The result will be user insights design teams can act upon when generating new solutions

2.2 PROCEDURE OF THE CASE STUDY AND FIRST INSIGHTS

To encounter a variety of participants and situations, this case study includes four different contextmapping studies. The studies are listed in ***table 1***: studies with children of two age groups, with elderly and with a mixed group of children and elderly together. The last study focuses on the interaction between the two generations to find out how to deal with the combination of groups.

Table 1: Overview of the studies

STUDY	PARTICIPANTS	GROUPS	RESEARCHERS
#1	25 Children 7/8 years old	5	2
#2	28 Children 10/11 years old	5	2
#3	9 Elderly 70+	2	1
#4	11 Children and elderly	1	2

The first three studies included a sensitizing period followed by a group session. Multiple groups of around 5 participants participated in these studies. Study 4 was different in that it did not include a sensitizing period and there was only one mixed group of 11.

The recruitment of the children was done at a primary school in Delft from which two classes participated. Since we were working with two different age groups the complexity of the materials and language was adapted to each group.

The recruitment of elderly went via a gymnastics group, a flower arranging group and calling door to door. The researchers approached forty elderly, nine of them were found willing to participate. Both the children and elderly received a sensitizing package (***figure 2.6***), which included a workbook with several assignments about moving and being active.

Recruiting children and elderly for a joint session was a challenge. Children didn't want to interact with unfamiliar elderly and elderly were not motivated to go to a school and interact with children they don't know. However, when the children were asked if some of them could bring their own grandparents for a session, the 5 spots for pairs of children and grandparents were easily filled.

STUDIES 1 AND 2: CONTEXTMAPPING WITH CHILDREN

The researchers started with presenting and discussing the project in each class and distributing the sensitizing packages. The sensitizing packages included a variety of assignments about how active the children are, what they do during the day (*figure 2.4*), different situations they encounter and their interaction with "old people". The children got one week to work on their sensitizing workbook before they came together for a contextmapping group session of 1,5 hour (*figure 2.5*).

The group sessions opened with an icebreaker to loosen up the children and prepare them for the next assignments. The icebreaker took the form of a playful exercise, which showed the children that all input is valued and every answer is interesting. After the icebreaker the children shared and compared the answers they gave in the sensitizing booklets and provided background information about certain answers. Subsequently, the children did two creative assignments; filling in an association scheme and the design of a new game to play with elderly, and discussed them within their group.

Figure 2.4 *One of the sensitizing assignments: a time-line of activities during the day*

Figure 2.5 *Contextmapping sessions with children*

STUDY 3: CONTEXTMAPPING WITH ELDERLY

During two group sessions (***figure 2.6 left*** and ***figure 2.7***), the elderly explained and discussed the answers they gave in the sensitizing booklets (***figure 2.6 right***). Subsequently they did three creative assignments: they made a collage about being active throughout the years, a map of a future movement garden and a game to play with children and elderly together. The assignments were different from the ones used with the children because elderly have more experience to draw from than children and we could discuss if their experiences changed over the years. Next to that, we expected that elderly have more worries about the movement garden and we wanted them to feel free to express those. The sessions with elderly took 3 hours.

Figure 2.6 *Session with elderly (left) and sensitizing packages (right)*

Figure 2.7 *Session with elderly*

STUDY 4: CONTEXTMAPPING WITH A MIXED GROUP.

During the combined group session the children and grandparents had to think of activities they already do together and what they would like to do in the future (***figure 2.8***). They designed a movement garden in pairs and discussed their design with the whole group. Finally both the group of children and the group of elderly thought of an intergenerational game and presented it to the other group.

Figure 2.8 *Mixed session*

2.3 THESIS RESEARCH: USER INVOLVEMENT IN RESEARCH ACTIVITIES

Now we switch from the user research in the ProFit project to the thesis research. From the perspective of the thesis research the main focus of this case study is to investigate the roles users played in research activities. In order to assess if activities that are originally partaken by the researcher can be transferred to some of the users, I will reflect on each of the research phases described in ***figure 2.2***.

Table 3: Research activities in the case study and the involvement of users

PHASE	RESEARCH ACTIVITIES	USER PARTICIPATION
Preparation	Set up research questions	
	Make research planning	
	Design materials	x
	Recruit participants	x
Gathering	Distribute materials	x
	Facilitate sessions	x
	Record sessions	x
	Process data	
Analysis	Prioritise data	
	Find themes and patterns	
	Link insights to design project	
Communication	Make insight cards	
	Communication sessions	

Table 3 shows the research phases from ***figure 2.2*** and the corresponding activities of the contextmapping case studies. An x shows that users participated in that particular activity. This was not the case in all activities and there are two reasons for that. First, the aim of this study was to set a baseline with contextmapping and in standard contextmapping users are not involved in every activity. Second, in the ProFit project companies took over after the user insights were gathered so I had no influence in what followed after. I expect that the analysis and communication can benefit from user involvement but that the challenges are different than in the preparation and gathering phase, which is another reason not to

Analysis and results of the user research.
The contextmapping sessions were analysed "on the wall" (see Sanders & Stappers, 2013). Which means that all sessions were recorded and transcribed and statement cards were made from interesting quotes and subsequently clustered. The results from this analysis are presented in the form of Insight Cards, a set of 27 cards with an explanation of the most important themes (*figure 2.9*). The cards were the main source of user insights for the ProFit innovation competition. They were designed to inform and inspire designers when thinking of ideas for the intergenerational movement park and as input to further develop their concepts.

User insights for ProFit
I will give examples of user insights that were used in the ProFit project in this section to give an idea of the kind of outcomes that come from contextmapping. Children and elderly were unfamiliar with the idea of sharing a space for social interaction and physical exercise. One of the first insights about this occurred during this combined session when children and their grandparents drew a map of the movement garden. Some of the intergenerational duos just drew a big line in the middle of the map and divided it in a children's part and an adult part.

During the sessions the participants mostly talked from their own perspective, but sometimes ideas came up that could be used by the combination of target groups, which was one of the goals of the user research. One example of an idea that involves the combination of the two target groups is the idea of a "run-and-read-race" (see insight card *figure 2.9 right*). The children wanted to come up with a competition, but realized that elderly don't have the same skills and interests as themselves. The children said: children are good at running and elderly are good at reading, so why not combine these skills into a race where you have to read a book aloud and run at the same time. The first one who finishes and reads all the words correctly wins. This is not a usable idea as such, but the way of thinking is inspirational. What are elderly good at and what are children good at and how can we combine this?

One of the experiences shared by the children during the contextmapping session was playing hide and seek with grandmother and her dog. When

the children are hidden, grandma instructs her little dog to go and search for them, when he finds the children he barks and grandma will know where to find them. This story fits to the opportunity to divide roles relating to the different capacities and interests of each participant, making it possible to combine the two target groups.

Communicating the insights to designers

All the insights from the contextmapping research are presented in insight cards, which can be found on www.fieldlabs.eu/research-main/user-needs-and-contexts. To make the cards useful and inspirational to designers each insight card consists of certain aspects (*figure 2.9*): an inspiring title, explanation of the theme and why it is important, raw data in the form of quotes or drawings, in some cases a visualization of the theme and a box of text that gives designers a starting point to work with that particular insight. This creates a mix of different levels of information to make the cards empathic, inspirational and engaging, as suggested by Sleeswijk Visser, 2009.

In the ProFit project, the insight cards were used to enthuse and prepare companies for the innovation competition. In Mix and Match sessions, companies and design students used the cards together as input for a brainstorm about products that stimulate children and elderly to be physically and socially active together. Five companies ultimately submitted a concept for the innovation competition. These concepts can be found in *table 2*. The pictures in this table show the variety of designs. Each company used several insight cards. The cards were not used literally, but to create understanding of and empathy for the target group and to show the context of use.

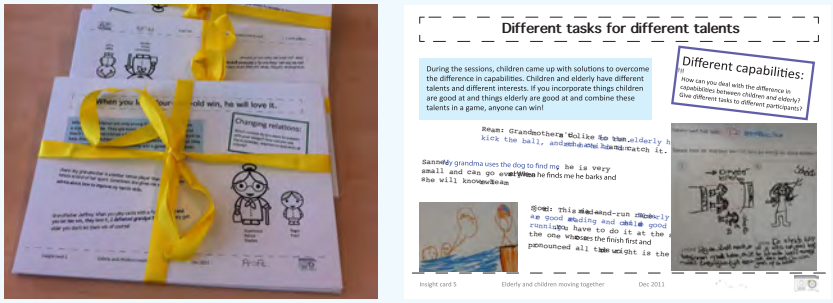
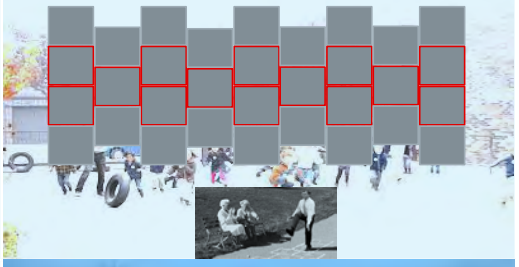
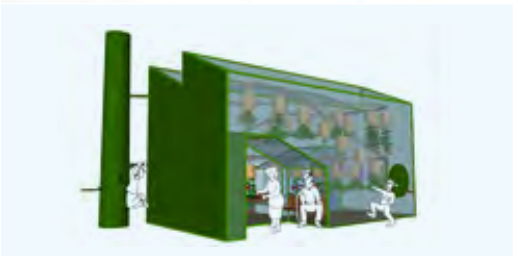


Figure 2.9 *Insight cards and example of an insight card*

Table 2: Company entries for the innovation competition

ENTRY	IDEA	CHILDREN & ELDERLY	
Vormdrift **Wordwall**	A touch wall with letter buttons to form words.	Children can develop language skills together with elderly in a playful way.	
Volhuis **Back to the Future**	Interactive tiles can display multiple games.	New and old games are implemented to serve both target groups.	
Yalp **Serious gaming**	Interactive poles with multiple games.	Many games can be developed for children and elderly.	
Woedz **Elements**	Blocks and backrests to build games and furniture.	Sharing the blocks makes children and elderly cooperate.	
Bureau Omgeef **Plant Factory**	Watering plants, by pumping and moving plants along a rail.	Elderly teach children about nature and children help with physical work.	

focus on the analysis and communication for now. In the next section I will discuss the

	LINK INSIGHT CARD	REPRESENTATION
	Elderly like to support their grandchildren in their development. Cards: 1, 5, 18	
	Seeing similarities between old and new games raises the interest in each other. Cards: 17, 25	
	Flexible games can adapt to the changing relationship between children and elderly Cards: 1, 2, 3, 11	
	Casual interaction creates bond between strangers Cards: 1, 4, 7, 13	
	Skills of children and elderly can supplement each other. Cards: 4, 5, 21	

opportunities for co-research in the preparation and gathering phase.

PREPARATION

In the preparation phase the user researcher involved users both in piloting the sensitizing materials and in recruiting elderly people for the combined session (*table 3*). Users influenced the design of the research materials during the pilot of the sensitizing booklet. In this pilot, I asked three children to think as researchers and to comment on a draft version of the sensitizing booklet. They addressed the aesthetics, logic and used language of the draft. While doing so, they showed the ability to speak on behalf of their peers. For example, they commented on the formulations of several questions in the booklet. These formulations were adapted according to the children's advice. However, not all their comments were followed up. For instance, children were enthusiastic about a font they couldn't read because it looked beautiful. The researchers decided to change the font to a more legible one and not follow the children's advice here.

Recruiting children via primary schools was convenient; once the school was convinced to participate, the children were accessible in neatly organized classes divided by age group. Recruiting elderly people was more difficult, but after contacting several organizations and going door-to-door I succeeded. Most challenging was recruiting participants for the combined session in which children and elderly worked together. Originally the plan was to recruit elderly and children that were not related to each other for a combined session in the school of the children because the municipality also wanted to bring people together that do not know each other. This turned out to be impossible, both the elderly people and children were unwilling to participate. When the children were asked to bring their grandparents it changed significantly. The grandparents were willing to participate without even knowing what they were going to do. They said they joined the session because their grandchildren asked and they wanted to spend time with them. So the children opened the door to their grandparents.

GATHERING

The location of the group sessions turned out to be important. The sessions with children were held during school hours and the schools offered us alternative rooms. Most of the sessions were held in an empty classroom where the children worked serious and focussed. Some sessions, however, were held in an empty gym room in which it was much more difficult for the children to focus and stay in their chairs. Overall the children loved skipping

class to join the contextmapping sessions. However, it was harder to motivate them for the actual research subject; their answers were often shallow and they needed materials, guidance and time more than the elderly did.

In both the elderly and the children groups we found that they had a shared understanding of their own peer group. It was harder for them to sympathize with the other age group. The children couldn't assess the needs and skills of elderly in their contextmapping sessions, and the elderly didn't have an understanding of what children are like these days. In the mixed session, their interest and empathy for each other increased, resulting in more insight in the interaction between the groups. For example, in the separated sessions the children were more interested in new technology and new games, where the elderly were nostalgic about the games they used to play when they were young. It seemed that they related play to very different experiences and had little common interests. But during the combined session, the two generations found out that some of the games the elderly played when they were young were very similar to games children play nowadays. Sometimes only the name had changed, or new technology is used for the same games, like playing cards on the computer. After finding this out, the children had renewed interest in their grandparents and asked for tips and tricks. By working together on creative assignments, participants could give immediate feedback on each other's ideas and the researcher observed their "live" interaction.

Although the facilitation of the sessions was the task of the researchers, the participants played a role in the group dynamics. In studies one and two we noticed that sometimes the group of children kept their peers from misbehaving. In study 3 there was one man who was closed off and a bit cynical at the start of the session. Other participants encouraged him to cheer up, a remark the researcher was not in a position to make.

In recording activities children especially took part actively. They were so intrigued by the audio recorders and cameras that were used, that they took responsibility for them to work well. Most of them figured out quickly that when the camera was recording a red light appeared. When the red light was not there or the audio recorders were not recording, this was immediately mentioned to the researcher.

2.4 DISCUSSION AND CONCLUSION - OPPORTUNITIES FOR CO-RESEARCH

In this section I describe opportunities and challenges for developing methods to involve participants as co-researchers in the preparation and gathering phase. The observations led to three main areas of attention: Access, content and motivation.

ACCESS TO THE TARGET GROUP

We have seen that a special relationship, such as between children and their grandparents, can help in recruiting. This is similar to snowball sampling or chain referral sampling (Biernacki & Waldorf 1981), in which participants collaborate in recruiting by referring to people they know with characteristics that are in the interest of the research. In this case study 2 different target groups were recruited through their relation. This has pragmatic advantages, since the separate recruitment did not work, but it also has its limits, for instance you will not be able to reach elderly who have no grandchildren.

CONTENT

The children showed that they are capable of empathising with peers and of giving valuable comments on research materials in terms of usability and attractiveness before actually using them. However, not all comments were regarded helpful by the researchers. So, users can act as informants but preparations cannot be delegated to them entirely.

Working together with a school often entails access to useful resources, for example the use of empty classrooms. In addition to that, participants can bring in interesting locations themselves, for example the home environment. With co-research we can make use of the additional resources the participants bring along, for example the opportunity to conduct research in the participant's garden or living room. Letting the co-researchers choose locations that are relevant according to them brings extra content for the research.

We noticed that the children and elderly had difficulties empathising with each other when they were in separate sessions, but when they were together in a session this was not a problem. When user research aims to learn about the interaction between people, making these interactions part of the research process, such as having one interview the other, gives extra opportunities for the research to yield significant findings.

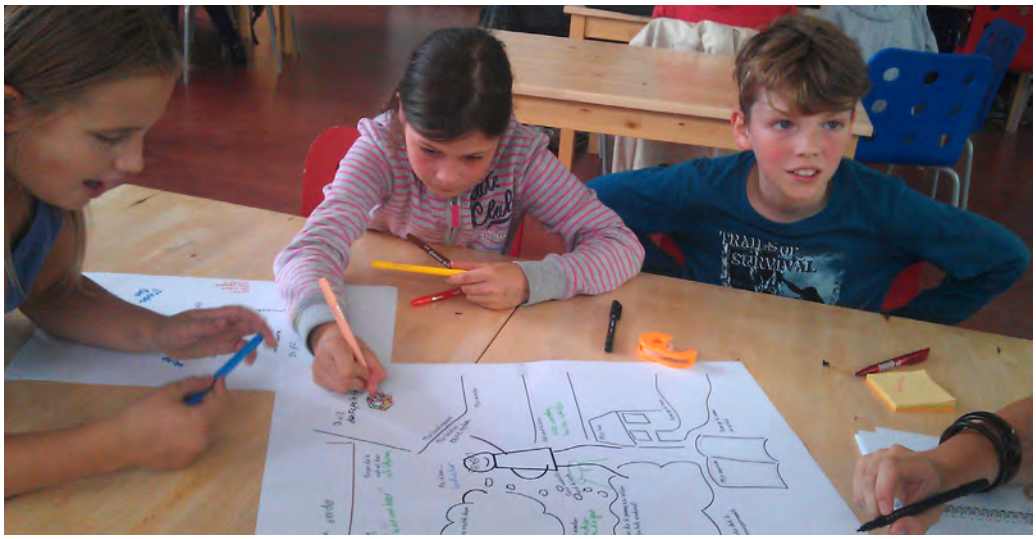
MOTIVATION

The recording devices are gadgets the children are very interested in. They feel proud to be trusted with a professional device. Giving co-researchers recording devices might be a good way to encourage the responsibility the children already willingly take on.

This chapter described field experience that formed the baseline for conducting contextual user research with children in this thesis. Even though no co-research was conducted yet, opportunities for co-research activities were found in three areas: access, motivation and content. In terms of access, co-researchers can provide a relevant connection to people and to places. In the area of motivation; by treating users as researchers they feel more responsible and motivated in a different way. Advantages on a content level are that co-researchers can give advice on research materials, not only by pilot testing but also by including them in the design, and might get different insights from participants because they are trusted.

The opportunities and challenges that were considered in this chapter are the ingredients for the co-research framework. In the next chapter I connect these ingredient to what has been written by others in order to build the framework in chapter 4.

CHAPTER 3 – INVOLVING CHILDREN IN DESIGN AND SOCIAL SCIENCES



3.0 INTRODUCTION

The previous chapter distilled opportunities for users to perform research activities in design from hands on experience. This chapter investigates the state of the art on children participating in design and searches for attempts and successes of others to involve children in the design process.

Although involving children in various roles in design is discussed in literature, the role of (user) researcher is notably absent. In other fields, like citizen participation in urban development and social policy, giving users the role of researcher is more common and has been practiced since the late 1960s. After examining the reasons to involve users (and especially children) as researchers in social research fields, the level at which users participate in research and in what way users are prepared for their role, I will position my own approach.

3.1 INVOLVING CHILDREN IN DESIGN

This thesis is closely related to the work in the Child-Computer Interaction (CCI) community. Within CCI, involving children in the design of technology is described in detail. Hourcade provides a compact overview of this field, which concerns "the study of design, evaluation and implementation of interactive computer systems for children, and the major phenomena surrounding them" (Hourcade, 2015). Next to CHI (Human Factors in Computing systems) conferences, IDC (Interaction Design and Children) conferences are since 2002 one of the main outlets for this community. At IDC, people from human-computer interaction, education and media studies come together and discuss research topics related to the design of interactive technologies for and with children.

According to Hourcade (2015), life-cycle models are used to outline the phases of development in creating interactive technology. These phases typically include: identifying needs and establishing requirements, designing the technology, implementing versions of the technology and evaluating requirements, designs or prototypes. Software engineering added an emphasis on iterative approaches to life-cycle models, adding depth and complexity with each iteration. The human-computer interaction field placed a greater emphasis on the involvement of users during the iterations as a means to increase the chance that the technology will be successful.

There is around 25 years of history of involving children in the technology design process. Where historically parents and teachers gave input about what children need, and designers trusted in their own childhood experiences, from the 1990s children slowly became involved in the design process more directly. Druin (2002) stresses that children have their own needs, cultures and complexities that differ from the views of parents and educators, making children valuable experts in the design process. In 'Towards a framework of co-design sessions with children' Mazzone et al. (2011) explain that the involvement of children is important to understand their needs.

Amongst authors, such as Fails et al (2012), there is a common belief that it is important to include children in technology that influences their lives. They find that when co-designing with children, they get more and more varied ideas than on their own. Druin (2002) argues that the influence of children leads to different design outcomes that are better adjusted to their needs. Next to that these authors want to empower children to have a say about the environment in which they live.

According to Iversen & Smith (2012), in Scandinavian Participatory Design, the end goal is not necessarily a final prototype, but helping children realize that they have a choice in the design of future technologies. The Scandinavian Participatory Design approach is based on values of democracy, skills, and emancipation.

Through a 9-month case study in which teenagers and designers design an interactive museum exhibition together, Iversen & Smith (2012) described how the participatory design process affected power relations, project evaluation, and the final outcome.

ROLES FOR CHILDREN TO BE INVOLVED IN DESIGN

Since the mid 1990s, researchers have successfully developed methods to involve children in the design process. To define the level of involvement of children in designing technology, Druin defined four roles children can take in the design process: user, tester, informant and design partner (Druin, 2002).

When children are involved as **user** (of existing technology), developers observe and interview children to understand the impact of existing technology so designers can learn from that for future designs. When children are **testers**, they test prototypes of new concepts before putting them on the market. These tests can involve low-fidelity prototypes, high fidelity prototypes or fully functional designs. As **informants**, children are involved in multiple stages of the design process as consultants. They share their ideas and opinions whenever

the design team thinks they are valuable. According to Hourcade (2015) typical activities in which children provide feedback and ideas are: trying out existing technology, giving feedback on developed ideas, and voicing opinions through questionnaires, interviews and focus groups (e.g. Read et al., 2004). Hourcade (2015) mentions that for design teams with a tight planning, as often occurs in industry, it is more convenient and efficient to include children as informant than as equal partners.

According to Druin (2002), as **design partners**, children are equal partners in the design team. They contribute to the entire design process, including decision-making, on a regular basis over a longer period of time. Ideally, ideas arise from collaborative activities between adults and children.

Druin pioneered with the concept of children as design partners and developed the Cooperative Inquiry method, building on participatory design and contextual inquiry (Beyer & Holtzblatt, 1998), in which multi-generational design teams work on several projects to design (mostly digital) technology for children (Druin, 1999). Part of the cooperative inquiry method is technology immersion, in which adults and children perform tasks while other adults and children observe them, take notes, and identify positive and negative aspects of the interactions and suggest improvements.
Druin's approach is to set up a group of children and adults. They start with an intensive two week camp and then have design sessions every week, or twice a week, for a period of a year or longer. According to Guha et al. (2013), a challenge in cooperative inquiry is the time needed to form the team; children need to develop the self-confidence to share their ideas and to tell adults if their ideas are not going to work.

To determine which of the 4 roles children play, Druin (2002) defined 3 dimensions (*figure 3.1*): relationship to developers, relationship to technology and goals for inquiry. The dimension 'relationship to technology' is focused on what kind of artefact the children will 'make'.

Iversen and Brodersen (2008) propose an alternative to Cooperative Inquiry called BRIDGE that involves children as participants in relevant communities of practice and designing for this community requires active participation of its members. Iversen and colleagues propose a dialogical process, in which children's values, what they care about and find important in life is implicitly and explicitly expressed during design activities. They shift the emphasis of design from technological artefacts to entire use ecologies into which technologies are integrated.

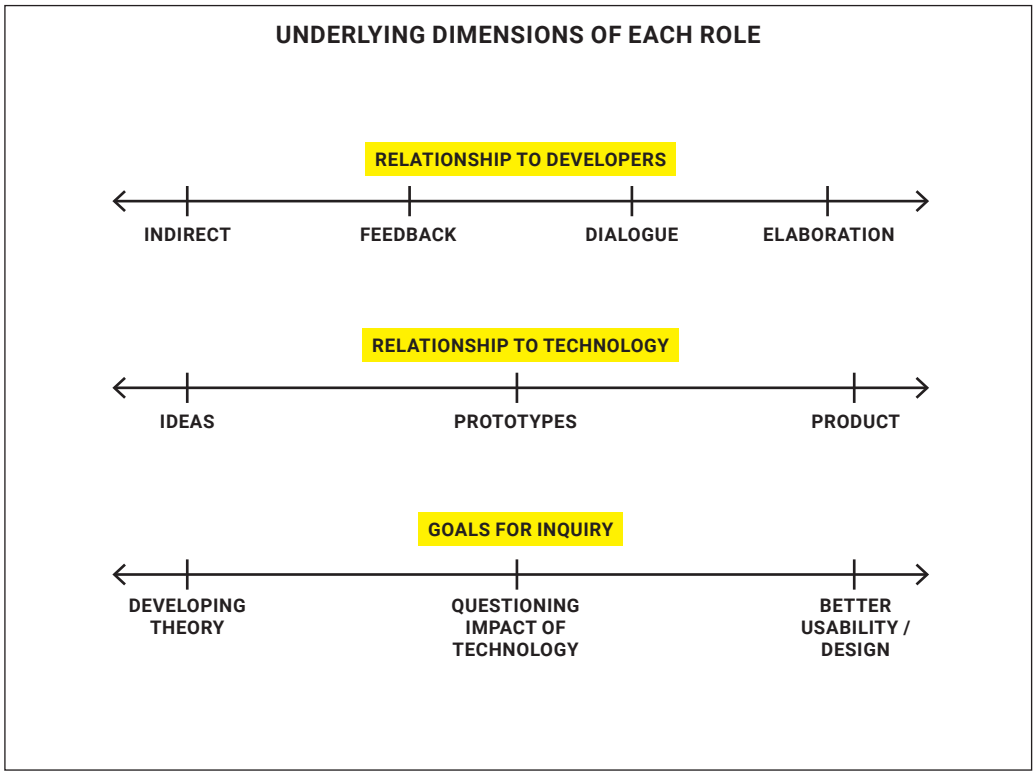


Figure 3.1 *Dimensions of roles children can take in the design process, adapted from Druin 2002*

STAGING, EVOKING AND ENACTING IN THE DESIGN PROCESS

As mentioned in chapter 1, users can be involved in different aspects of the design process. Johansson (2005) used the terms 'staging' 'evoking' and 'enacting' to structure these aspects. This thesis focusses on 'staging' aspects of the design process. According to Johansson, '**staging**' activities explore the space of opportunity by understanding the current world and gathering inspirational data to find opportunities for design. Techniques with a staging-focus are for example: observation and interviews.

Stepping in the to-be-designed world and defining concepts for future practice based on the design context is described by Johansson as '**evoking**'. Techniques with an evoking-nature are for example brainstorms, making design concepts and scenarios. Johansson uses '**enacting**' for the exploration of a design idea in relation to the real world again. Techniques for enacting are for example: making low-tech prototypes (e.g. the bags of stuff used in Jip et al. 2013) or acting out scenarios (e.g Brandt & Grunnet, 2000).

I will use the terms staging, evoking and enacting because other researchers (e.g. Brandt 2006, Dindler & Iversen 2007), also took these aspects as a framework to discuss techniques and tools for user participation in design. Next to that, they are clearer than the division between design and research I gave in the first chapter. With this framework in mind I will take a closer look at how children are involved in the design process.

INVOLVING CHILDREN IN EVOKING ASPECTS

Many of the participatory methods and techniques that were found in CCI literature focus on generating ideas. For example: Moraveji et al. 2007 developed techniques to brainstorm with kids, Guha et al. 2004 combined ideas of individual children to one collaborative idea, Vaajakallio et al., 2010 and Sluis-Thiescheffer et al. 2007 used make-tools to prototype with children.

All these techniques involve children in "evoking" activities, letting them step in the to-be-designed world and think of new ideas. Or, as Vaajakallio et al. (2010) formulates it they perform "activities in which potential users are empowered to bring their ideas into the design of new solutions". A reason for the emphasis on the evoking phase might be that many of these projects take a certain technology as starting point and have a sense of what to build at the beginning of the project.

INVOLVING CHILDREN IN STAGING ASPECTS

Some methods and techniques do consider the staging phase, in which inspirational data is gathered to find opportunities for design. A typical activity may involve observation or competitive assessment, like in technology immersion, which is part of cooperative inquiry. A recent example of technology immersion can be found in Grufberg and Jonsson (2012) who let children explore sensors that are used in toys and consoles to achieve a deeper understanding of the sensors. This helped the children later on when generating ideas. So the staging activities are often used to prepare the children for idea generation. This is also the case in the "Primed Design Activity approach" by Fitton et al. (2014). They describe a case study in which a 5Ws sheet (who, where, what, why, when) and scenario of an event in the children's lives were used to prime the participants without biasing the outcomes to make the design activity as effective as possible whilst also collecting valuable output. Staging activities in CCI are more often more focused on observing and discussing existing technology in order to develop requirements, than on capturing experiences and gaining

insight in the design context, which is the focus of this thesis.

Other techniques to involve children in capturing experiences and gaining insight in the design context are for example the KidReporter method that was discussed in chapter 1, 'bonded design' and 'fictional inquiry', all of which I will introduce here shortly.

'**KidReporter**' (Bekker, 2003) can be used to gather user requirements from children for a specific product. It includes different traditional methods, like interviewing, observing and questionnaires. As mentioned in chapter 1, Bekker (2003) describes a case study in which the researchers wanted to find out what children find interesting in a Zoo and the kind of language they use. These questions can be considered as belonging to the staging phase, since they give insight in the design context. In this study some of the participating children interviewed each other, making sure the children could give their opinion with relatively little influence from adults. The outcomes influenced the requirements and the final design of a game.

Fictional inquiry (Dindler & Iversen, 2007) is a participatory design technique that makes use of fictional narratives to make participants talk about their context and/or think of new ideas. The story the participants work with should be related to the real context, but keep enough distance to enable them to broaden their view. This technique can serve 'staging' goals, for example when children explain their life at school to aliens from Mars (Dindler et al. 2005), or 'evoking' goals, for example when families think of ideas for a marine centre with the help of magic objects that belong to the king of Atlantis (Dindler & Iversen, 2007).

Bonded Design (Large et al., 2006) is a method that builds on cooperative inquiry in the sense that it also gives children ('users' in *figure 3.2*) an active role in the design process and emphasizes working in intergenerational teams of children and designers towards a common goal. However, Bonded Design questions the extent to which equality can exist in teams of children and adults. Bonded design acknowledges that each group has its own unique expertise and weaknesses and that children know little about the design process and adults know little of how children think. Within Bonded Design, adults set the agenda, design the research plan, organize the sessions and keep order. Staging aspects in Bonded Design can be found in the first session (*figure 3.2*), which focuses on needs assessment. This needs assessment is conducted with a questionnaire formulated by adults and conducted by the children among their peers at school (Large et al., 2006). So the expertise of children about how children think is not used in setting up the questionnaire.

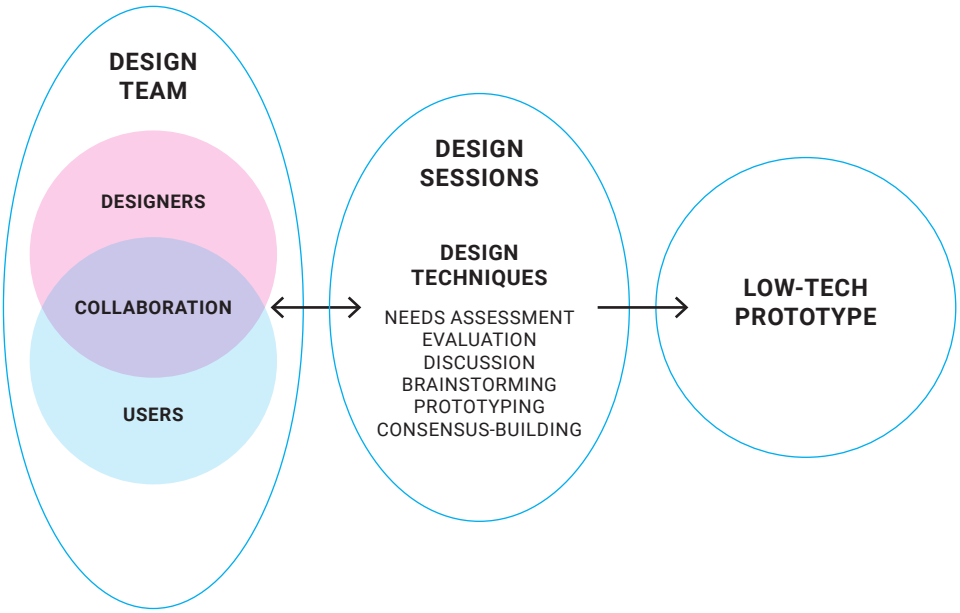


Figure 3.2 *The bonded design model, adapted from Large et al. 2006*

3.2 SITUATING MY OWN APPROACH

Hourcade (2015) mentions the work in this thesis (Case 1 - van Doorn et al. 2014) as an example of an activity in the identifying needs and establishing requirements phase. I agree to this classification to some extend, although the results of the research in this thesis are not requirements but user insights that can steer the direction of the design team when developing products and or services.

The difference of the approach of this thesis and the described status quo in CCI can be found in several aspects:

1 - INFORMATION AND INSPIRATION ABOUT THE CONTEXT OF USE.

In the previous sections it became clear that there are different approaches when it comes to involving children in the design process. Many studies, amongst others the work of Druin on cooperative inquiry, focus the design process on the artefact and the technology to develop, for example, by incorporating technology immersion as one of the starting activities of a design project.

I agree with Smith et al. (2013), who suggest that this is a narrow scope and that most technology or products are part of a bigger ecology of use in which technologies are integrated. Iversen and colleagues propose a highly dialogical process, in which children's values, what they care about and find important in life is implicitly and explicitly expressed during design activities.

The approach in this thesis builds on contextmapping (Sleeswijk Visser et al. 2005, Gielen 2013) and focuses on the context of the users, their practices, wishes and needs. It targets open-ended design projects where the outcomes are not defined yet and are not restricted to a particular technology but can be shaped by user insights in the explorative phase of the design project.

To position this thesis in Druin's dimensions depicted in ***figure 3.1***, 'staging' aspects need to be added. Adding 'Staging' to Druin's dimension 'relationship to technology' could be done for example by adding '**insight in design context**' before 'ideas' (***figure 3.3***). And to the dimension 'Goals for inquiry', we could add '**finding design opportunities**' to include staging aspects before 'developing theory' (***figure 3.3***). The focus of this thesis, co-research at the start of the design project, would fit in the newly added aspects of ***figure 3.3***.

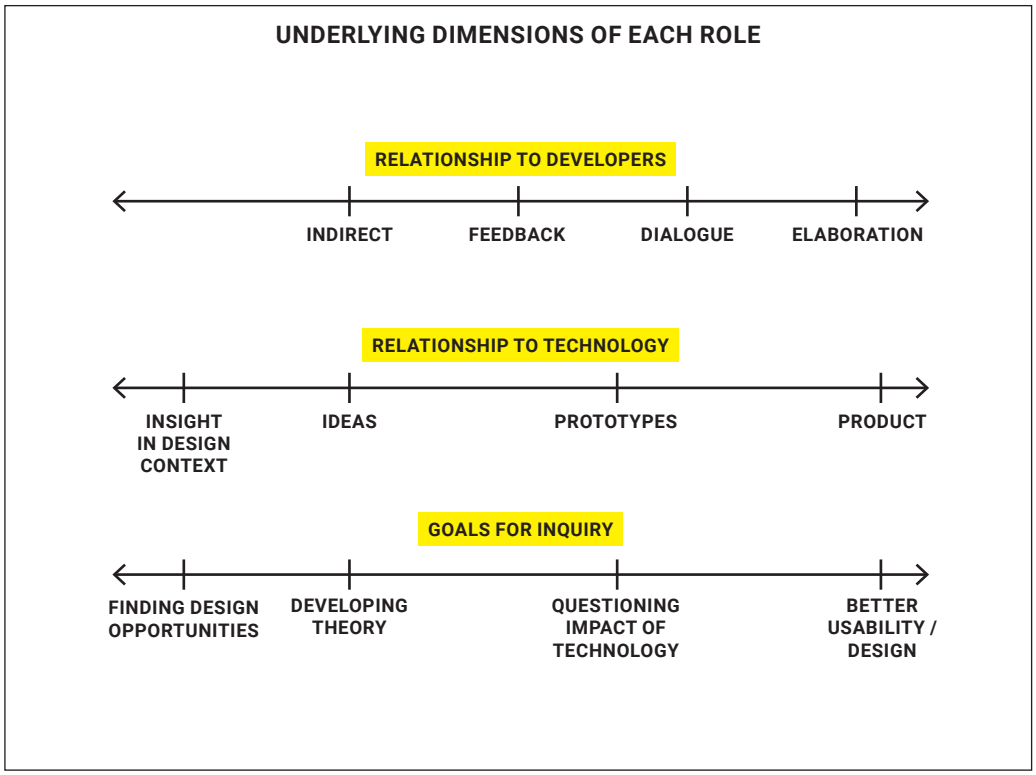


Figure 3.3 *Dimensions adapted from Druin 2002, to include 'staging' aspect*

2 - NO INTERGENERATIONAL TEAMS

Both cooperative inquiry and bonded design work with design teams consisting of both children and adults. Large (2006) states that these combined teams: 'bring together adult experts in design and child experts in being children'. Druin uses combined teams because she argues that the most important goal of a partnership between adults and children is 'idea elaboration', when adults and children build on each other's ideas and share in the process together. For this to happen, the power imbalance between adults and children needs to be broken down. According to Druin, this can take up to 6 months. Other researchers counter the power imbalance between adults and children in other ways. Antle (2008), for example, used intra-generational interviews to reduce power imbalance when she explored childhood needs with children. In these interviews a 15-year old interviewed and videotaped children aged 9-11. According to Antle, the results were 'surprisingly candid and emotional'.

In my studies I choose for shorter time spans, and more homogeneous teams, in order for my research to fit in with contextual research in design practice. In industry there is very rarely time for design projects or opportunities to facilitate a long-term intergenerational design team. Next to that, users (and designers) involved in each project are different. So for each case a specific target group is needed. For the ProFit cases in this thesis, for example, the intended users are children who live nearby the Fieldlab. To overcome the power distance and to capture authentic insights without spending months on team building, this thesis searches for a combination of conversations between peers and sessions where a group of children interacts with a minority of one or design researchers.

3 – A MIX BETWEEN THE USER'S TURF AND THE DESIGNER'S TURF

Iversen and Broderson (2008) describe that there are basically two spaces in which Participatory Design occurs: either the designers enter the world of the users; or the users are invited to the design laboratory. According to Iversen and Broderson (2008), on the designer's turf users tend to take a more general view, on the user's turf the conversations are more concrete and grounded in practice experiences.

The BRIDGE method described by Iversen and Broderson (2008), establishes a shared narrative space in which both children and designers gain access to the existing use practice. Co-research in this thesis makes a combination of peer-to-peer conversations within the context of the user, and sessions with small groups of co-researchers led by a design researcher. I expect that the combination of the personal conversations without the design researcher present and the sessions in which the design researcher can steer the co-researchers in a certain direction give the combination of both concrete experiences grounded in practice and a more general view.

4 – EXPLICITLY COMMUNICATE THE ROLE OF RESEARCHER TO CHILDREN

In CCI, children are often approached as experts of being children and as part of the design team to empower them and reduce the power distance (Hourcade, 2015). When they are involved in research-oriented activities it is often to prime themselves and as a starting point to engage in design activities in which they give "useful output" like design ideas and scenario sketches (Fitton et al., 2014). In this thesis the insights that derive from research activities are the main output of the children. By explicitly approaching them as researcher their expert role might be enlarged.

3.3 DEVELOPMENTAL PSYCHOLOGY AND INVOLVING CHILDREN IN DESIGN

In CCI developmental psychology is often referred to when developing technology for children to learn. Developmental psychology studies the development of human beings as they develop from infants to adults. Piaget, a founding father in the field of developmental psychology, divides the cognitive development of children into a series of stages. According to Piaget children go through these stages in the same order, but at different speeds (Boyd & Bee, 2012).

The main target group in this thesis are children in the age range of 7-12. This group can be classified in Piaget's 'concrete operational stage', to which he allocates the age range of 7-11 (Boyd & Bee, 2012). In this stage, children are more likely to appreciate someone else's perspective than before and they can solve problems by thinking logically but are typically not able to think abstractly or hypothetically.

The idea that children behave consistently when they are in a certain developmental stage has been criticized. Flavell et al. (2002) argue that there are more aspects that influence children's behaviour during a certain task than just their developmental stage, for example social support, the amount of information and instructions. According to Flavell et al (2002), children are more capable than Piaget thought when taking these aspects into account. Siegler (2007) emphasizes the high amount of within- and between varieties between children and argues that developmental stages only indicate a likelihood that a child will behave in a certain way.

Piaget proposed that learning occurs through adaptation, an active process in which children actively construct their own knowledge through experiences. Papert, a pioneer in designing computer technology for children, expanded on that idea and said that rather than experiencing the world, children should be the authors of those experiences and learn by doing. The ideas or Papert had a big influence on the Child Computer Interaction community, resulting in the conviction that children should participate in designing the technologies they use (Hourcade, 2015).
The theory of Piaget is focussed on individual development. Vygotsky, another founding father of developmental psychology, highlighted the importance of social interaction in the development of cognition (Hourcade, 2015). He observed that children are able to develop an understanding of and complete tasks with help of adults or older children before they can complete it on their own. Vygotsky called this the zone of proximal development.

This thesis focuses on the methodology of involving children in design. The outcomes of a design project that deploys co-research might have a developmental goal. However, co-research itself does not intend to influence the development of participating children.

In the development of the co-research approach, two insights from developmental psychology are especially useful. Firstly, the used tools and materials need to match the skills and understanding of the children. In the study in chapter 2, children with different levels of skills worked with the provided tools and materials. We noticed that it was important to stay well within the skills of the children because when children are working on the maximum of their skills, the tools become distractive of the goal: facilitating children to express their experiences.

Secondly, in the training session in which children learn to conduct research. During this training the children will "learn by doing" and practice their interview on group members. Afterwards the small group of peers and the researcher will reflect on how it went and help the co-researcher improve, which relates to the social support mentioned by Vygotsky.

To conclude, the skills and behaviours of children are divers and situated. In the case studies in this thesis, researchers will be working with small groups of children, mixed age groups and uncertainty of who will participate before the start, therefore the exact developmental stage is not relevant. In this thesis the focus is not on the development of children. The materials and tools need to stay well within the boundaries of children's understanding and skills in order to focus on the goal of the tool instead of on its form. By using the tools and materials in a range of case studies, they will be adapted to a diversity of children and situations.

3.4 INVOLVING CHILDREN IN SOCIOLOGY

The first part of this chapter investigated how children are involved in design. Some examples were found of children performing as researchers (Bekker et al. 2003, Antle 2008). However, in other fields, like urban development and social care and policy-making, user involvement as researchers is more common. This section investigates how users, and mainly children, are currently involved in social research. In the next section I will compare these findings with the findings from the design field and determine my own approach.

LEVEL OF PARTICIPATION

Over the years a variety of researchers and organisations developed participation models. There are over 30 different forms, ranging from ladders, to triangles to wheels. One of the classic and most influential models is the 'ladder of citizen participation' developed by Arnstein in 1969. As criticism on citizens being excluded from political and economic processes, Arnstein defined eight levels of participation, from manipulation to citizen control. Each level increases the extent of user participation and the influence participants have on determining the process and outcomes. A struggle in the highest level, citizen control, is; who originates and makes decisions about research and evaluation.

The ladder Arnstein's ladder was adapted by Hart (1992) to model the involvement of children and youth in political decision-making. At that time, children's rights began to get more attention and children's ability to speak for themselves was taken more seriously. Hart calls the lower three rungs in ***figure 3.4*** non-participation, because in these rungs children are used as decoration but not really listened to. The upper five rungs are seen as participation and go from informing children to letting them make decisions.

The models of Arnstein and Hart focus on participation in political decision-making. But there are also models for child participation from social research that focus on the research process itself. In social research the term 'co-researcher' is used by multiple researchers, synonymously with peer interviewer and peer-researcher, based on the key-principle that the researcher belongs to the same group as the participants.

Bradbury-Jones (2014) discusses four levels in which children can be involved in social research. She calls these levels: "(1) Sources or research data, (2) consultation role, (3) research collaborators, and (4) research ownership". Which level of involvement is suitable depends, according to Bradbury-Jones, on the context of the research and competence and age of the children. To determine the level of engagement, they consider if children are involved in decision making, if they have influence on the research set up, if they take part in data collection and analysis and finally in dissemination of the results. Level 3 and 4 give children ownership over the research.

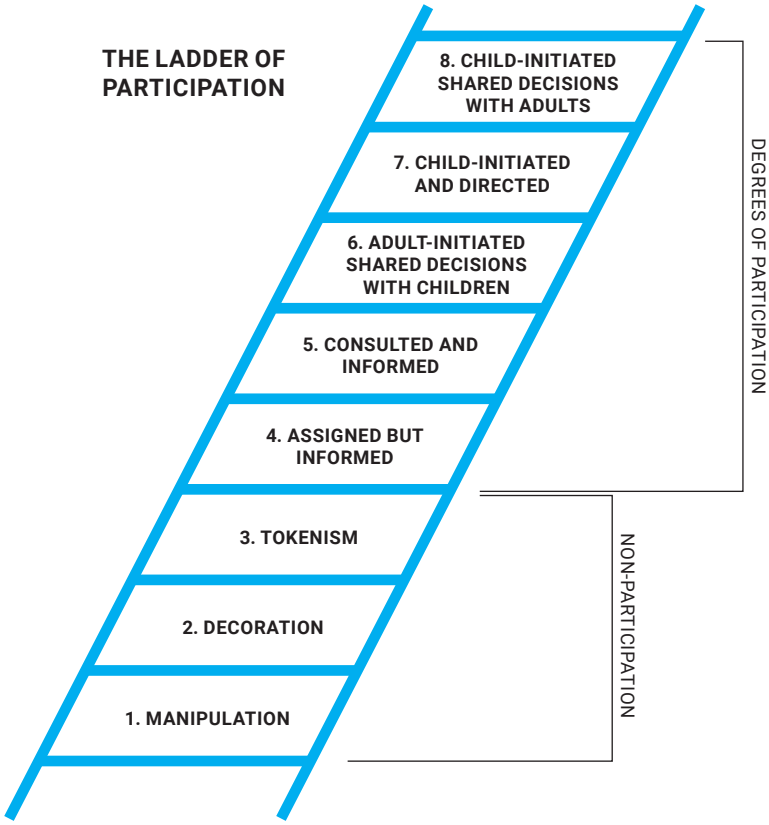


Figure 3.4 *Ladder of child participation, adapted from Hart 1992*

REASONS FOR USER PARTICIPATION IN SOCIAL RESEARCH

Why do social researchers involve users in the research process? What are the benefits of giving them an active role and influence? The main motives found in literature can be summarized in three themes: Empowerment of the target group by representation, getting an insider's perspective on the research subject and development or education of participants.

Reason 1- Empowerment

User participation in social research is often applied to make sure that the voice of minorities and vulnerable target groups, such as elderly, disability groups and people making use of health services, is heard (Kellett, 2005). According to Beresford (2002), instead of research done 'on' these target groups by disconnected outsiders, researchers give these target groups the possibility to speak and act on their own behalf and influence their own lives.

When it comes to children, an increasing number of researchers, for example in the platform 'Researching Children International', state that children should be enabled to participate in research concerning themselves, because it affects their lives and surroundings and contributes to their empowerment. These researchers are from different fields like anthropology, sociology, nursing and law. They are supported and driven by article 12 of the UN convention of the rights of the child, which states that children have the right to form and express their views in all matters affecting them. To quote Kellett (2005): 'the concept of children as active researchers is rapidly gaining credence in response to changing perspectives on children's status in society'. According to Dedding et al. (2013) when children participate in research it strengthens their involvement in society and their understanding of democracy, which leads to a healthy and strong community.

Especially in the UK this movement gets attention. In almost every city, there are 'young advisors': groups of young people who are actively involved in research about governmental issues. Examples of such groups are the 'Pear group' (sic) and the 'Sheffield young advisors'. The organization 'Involve' that promotes public involvement in public health and social care research in the UK, developed guides about how to actively involve the public (Hanley et al. 2004) and young people (Kirby, 2004) in research. In the Netherlands, Stichting Alexander is a non-profit research and advice bureau that implements projects related to youth participation in different social sectors such as welfare, care, health, education, employment, and arts & culture.

Reason 2 - Insider's perspective

Another reason to actively involve children in research is that it influences the results and outcomes. In organizational research for example, academics and practitioners are engaged in 'insider-outsider' research and work together to combine different kinds of knowledge and skills (Bartunek, 1996).

Dedding et al. (2013) describe how participation of children in research also leads to new insights and different outcomes, since children possess knowledge and experiences that are unique to their situation.

Kellett (2005) states that the insider's perspective is an important motivation to conduct peer interviews: 'children may be more willing to talk to their peers, as they perceive the encounter as less threatening and less hierarchical. It is true that young people will raise issues with other young people they would not raise with an adult.' Dedding et al. (2013) emphasize that in order to get the insiders perspectives from children, researchers have to share control: "sharing control of the research makes children feel a co-owner. They feel responsible for the quality of the research. Giving them ownership requires flexibility and courage from the

researcher, but experience shows that this is often rewarded. Sharing control is only useful when you stay close to the child's own experiences"

Reason 3 - Personal development and education

The motivation of personal development and education is closely related to the earlier-mentioned reason 'empowerment'. However, personal development is about developing skills and is only applicable to children actually participating in the research. Empowerment on the other hand concerns a whole group.

According to Dedding et al. (2013) involving children in research adds to their personal development. Hart (2013) adds that there are indications that participation in research contributes to cognitive, social and identity development of children. Landsdown (2001) puts it this way: 'By learning to ask questions and express opinions children develop competencies to judge the many issues they will encounter when growing up.'

According to Bradbury-Jones & Taylor (2015), researchers need to provide the appropriate information, support and guidance to their co-researchers. Training is an important start to prepare for the researchers role. There are examples of elaborate bespoke training programs, lasting 2 full days or more (Bradbury-Jones & Taylor (2015), Kellett (2005)). Topics that are discussed and practiced in these trainings are: research methods, critical thinking, research skills, ethics and sometimes dissemination.

These projects are long term and open-ended. Researchers facilitate and guide children for months (Bergström et al. (2010)), half a year (Burns & Schubotz (2009)), or longer (McLaughlin (2005)). Children are often free to follow their own direction and researchers see where the children lead them (Porter at al. (2010). Bradbury-Jones (2014) adds that the recruitment process of the co-researchers, the ethical issues that need to be considered and the need to ensure appropriate training for the young researchers, make this type of research likely to be more time-consuming than when children get the role of participant.

3.5 CONCLUSIONS

The main goal of user participation in this thesis is to gather user insights in order to allow design teams to develop products that meet the user's needs. The users involved in the design projects in this thesis are representatives of bigger groups of people in the same circumstances that the design projects target on. I believe that the expertise of children is on 'being a child' and that children's

experiences, context, wishes and needs are valuable input for the design process. This relates to "reason 2: the insider's perspective" in the previous section. The other reasons are interesting side effects.

Placing the research in this thesis on Hart's ladder (***figure 3.4***), it is situated on rung 5, since children are consulted in the set-up of the research and take active part in collecting and partly in analysing the data, but adult researchers initiate the research and make important decisions. This is because the design projects this thesis focuses on, are often projects with limited time that involve multiple stakeholders and in which a balance needs to be found between wishes and needs from clients, designers and users.

A striking difference between child involvement in design and in social research is the amount of attention paid to training and skills. In social research the projects are long-term and open-ended. Children can determine the focus and the outcomes are often in the form of policy, management strategies or awareness campaigns. That is an important difference from design. Within design, outcomes are more restricted and time and money for research is limited. In design, usually no attention is paid to skill development or training of users. I believe that paying attention to training instead of only building on natural creativity and children's expertise on being a child can bring added value to the design process. I expect that preparing children for their involvement will increase the quality of their input. So, in my research I will search for a balance between skill development, insights delivered and time efficiency.

When looking specifically at involving children in design research, the contribution this thesis makes is within the 'staging' phase of Johansson's model, since it deals with understanding experiences of children and their wishes, needs and values, before focussing on the product or technology that will be developed. This part is overlooked in many design projects that focus on creative assignments in order to think of ideas and products.

Another aspect that makes this work different from existing literature within CCI is the use of peer-to-peer research; children conducting research with peers. Some researchers (Large 2006, Druin 2002) work with intergenerational design teams, but I want to make use of the special connection between peers. I expect that listening to children's conversations, without the direct interference of adults, can give a more authentic glimpse into their world. Children speak the same language and friends share trust and a joint history. In general, I expect that people have different interactions with their peers than with a researcher.

All these aspects contribute to the vision on conducting co-research as part of design that I describe in the next chapter.

CHAPTER 4 - INITIAL FRAMEWORK

4.0 INTRODUCTION

The previous two chapters explored field experience and literature. In this chapter these two are brought together in a framework that gives an overview of the aspects I want to focus on. This framework will serve as a lens to look through when conducting the case studies. The structure of the framework makes it possible to determine if insights from the case studies were expected or if they are new and surprising. After the case studies this initial framework will be elaborated in chapter 6.

4.1 RESEARCHERS AND PARTICIPANTS IN CONTEXTUAL USER RESEARCH

Contextual user research investigates the context of a situation that a design project aims to improve, by involving the people in and around it. The outcomes are rich contextual insights to inform and inspire designers. Most contextual studies involve two key actors (see ***figure 4.1***): the user researcher and the participant. The user researcher explores the context of future use by studying the daily life, experiences, wishes and needs of participants. After gathering data, the user researcher analyses the data and transforms it into information and inspiration that can be used to design solutions that fit the users.

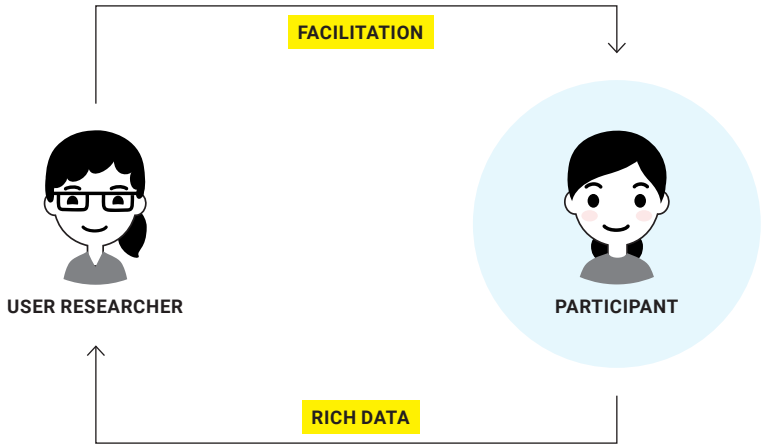


Figure 4.1: The researcher and the participant in a contextual study

4.2 ADDING THE CO-RESEARCHER

Experiences reported in chapter 2 and literature from chapter 3 showed that involving a user in research activities can increase the motivation of that user, facilitate access to other users, and leads to rich data due to trust and shared experiences between users.
In *figure 4.2* the co-researcher stands on the overlap between two different worlds, being both researcher and user. This position leads to some questions that will be answered in the case studies: What opportunities and challenges does this position of the co-researcher bring? And how does the role of co-researcher differ from the role of user and from the role of researcher?

In the next sections I will zoom in, first on the relation between the researcher and the co-researcher and then on the relation between the co-researcher and the participant.

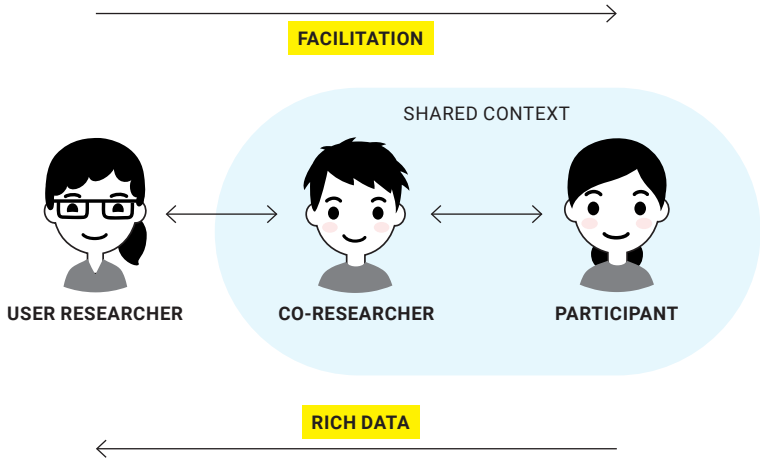


Figure 4.2: Placing the co-researcher in-between the researcher and the other users

4.3 THE RELATION BETWEEN RESEARCHER AND CO-RESEARCHER

Co-researchers need skills to conduct part of the user research. And in order for the researcher to trust that the co-researcher will do a good job, he needs to know that the co-researcher has the necessary skills. However, is it just a matter of copying skills from the researcher to the co-researcher or can the skills of co-researchers add value to the research team?

Nieminen (2015) developed a User Centred Design competency model, outlining twelve important competencies necessary for a designer or design team to conduct a user involved design project. Three of the twelve competencies in Nieminen's model are defined as "user strengths" (*table 4*). I expect that these are competencies co-researchers can excel in, because co-researchers are both user and researcher.

Adding a user to the research team in the role of co-researcher might increase the 'user strengths' of the research team in the following ways:

Subject domain
Subject domain experience, according to Nieminen (2015) this competency can only be gained through personal experience and is often hidden from view as tacit knowledge. If a co-researcher is an experienced actor in a subject domain he will score high on this competency, leading to a better understanding of what to look for

Context availability
Context availability is especially important during user research. Co-researchers have the real context of use available to them, whereas researchers might have limited means of entry.

User cultures, social networks and practices
To recognize and make sense of common practices, for example jargon, inside information of user cultures is often necessary. Co-researchers have this inside information. Nieminen states that a team scores high on this competency when the "group includes members of the target sub-culture and relevant practices are internal to the group and members may invite even wider audiences on demand".

Table 4: User strengths from Nieminen (2015) User Centred Design Competencies

1. Subject domain experience	(Tacit) knowledge, crafts and skills gained by (long) experience.
2. Context availability	Access to real context of use, may be restricted or difficult to arrange.
3. User cultures, Social networks and Practices	Understanding of the language, culture and common practice of the user group that can be difficult to grasp and utilize in a design project.

In chapter 2, I introduced the term "access". With access I mean both physical access and sharing the same context, so in "access" I combine the two competencies Nieminen calls 'Context availability' and 'User cultures, social networks and practices'. For example, a co-researcher interviewing his brother at home can both find his brother and conduct the interview in a location at which both the participant and the co-researcher are 'at home' in a shared context.

If co-researchers can contribute these three competencies to the research team they increase the quality of the research team. In the case studies I will explore how co-researchers can utilise these competencies by redistributing tasks and responsibilities from the researcher to the co-researchers.

4.4 THE RELATION BETWEEN CO-RESEARCHER AND PARTICIPANT

The focus of this thesis lies on co-researchers from the intended target group. However, the added value of increased user competencies might also be applicable to people that are not part of the target group themselves but are close to people in the target group. ***Figure 4.3*** shows six different configurations that can be distinguished based on social connectedness and proximity of the co-researcher to the target group. On the vertical axis there are two options; the co-researcher and the participant know each other or they do not. On the horizontal axis there are three options: the co-researcher is part of the target group, is related to the target group or is unrelated to the target group. ***Figure 4.3*** shows an example in each cell to illustrate the different relations between the co-researcher and the participant.

The closer the co-researcher is to the target group the higher the added value to the "user strength" competencies discussed in the precious section and to the 'insiders knowledge' discussed in chapter 3. This thesis focuses on co-researchers from the target group but also considers co-researchers that are not part of the target group themselves in some case studies, to see if they add value to the research team. In ***figure 4.3*** I only consider the fields that are highlighted.

Co-researcher is not related to participant	Child from another school	Someone else's parents	Regular researcher
Co-researcher is related to participant	Sister or friend	Parent	Friendly neighbour without kids
	Co-researcher is part of the target group	Co-researcher is related to the target group	Co-researcher is not part of the target group

Figure 4.3: Configurations of the relationship between co-researcher and participant in terms of social connectedness and proximity to the target group. The fields this thesis considers are highlighted.

4.5 RESEARCH ACTIVITIES IN CO-RESEARCH

Figure 4.4 repeats the basic sequence of contextual user research from Sanders & Stappers (2013) that was displayed in chapter 2. After preparation, the research part of this figure includes gathering, analysis and communication. In the case studies I will be looking for roles co-researchers can play in these different phases. In this section I will shortly discuss the focus of attention in each phase.

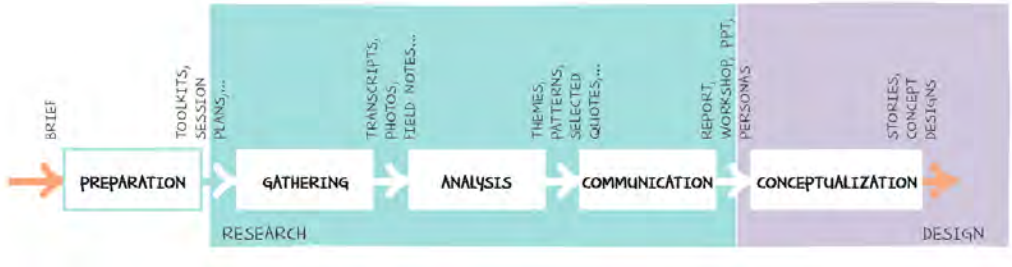


Figure 4.4: Basic sequence of contextual user research from Sanders & Stappers (2013)

PREPARING THE CO-RESEARCHERS

Bradbury-Jones (2014) stresses the importance of the first step in co-research studies, in which a connection is established between the researcher and the co-researchers. In this first step, (possible) co-researchers are provided with extensive information about the research and their role in it. The researcher prepares the co-researchers for data collection by explaining their tasks, motivating them and developing their skills and confidence.
In the case studies a compact but effective way to prepare and train co-researchers for contextual studies will be developed because, compared to the studies Bradbury-Jones describes, time is limited in design projects.

Questions I will answer in the case studies that are linked to this phase are: How can co-researchers be prepared? How can they be motivated? What kind of tools can help the co-researchers to prepare?

A part of the preparation is getting informed consent from participants. For a researcher, the well-being of the participant should be of great importance, especially when it concerns a vulnerable target group like children. In co-research these ethical considerations take

place on two levels, since there are two different kinds of participants: the co- researchers and their participants. This presents another challenge: The researcher has to get informed consent from the co-researchers and is responsible for the consent of the participant and the co-researchers have to get informed consent from their participants. However, to what degree can this be delegated to a child researcher? In the end the researcher is responsible for achieving both consents.

GATHERING BY CO-RESEARCHERS

In this phase the co-researchers conduct research with their peers. Co-researchers perform this step peer-to peer, without the researcher being present. I expect that this peer-to-peer interaction will lead to authentic conversations without the influence of power imbalance. However, the fact that the researcher is not present might also lead to challenges: How can the researcher make sure the co-researcher is focused on the research topic that is relevant for the study? How can the co-researchers be guided through the process? How can they record the data? What kind of tools can help the co-researchers to gather data?

ANALYSIS BY CO-RESEARCHERS

After the co-researchers gathered participant data, the next step is to reflect on the data from their insider's perspective and make first connections and priorities.

Some co-research studies in social research report on interpreting the data together with co-researchers, talking about results and their interpretation (Foster-Fishman et al. 2010, Nind 2011). I could not find this joint analysis in cases in design research literature. In the case studies in this thesis, tools will be developed to help co-researchers to interpret and connect data, both alone and guided by the researcher.

COMMUNICATION BY CO-RESEARCHERS

This is a crucial step in the co-research process. If the gathered data and the interpretations from the co-researchers are not communicated to the lead researcher it is a lost effort. There are two levels of data, the raw data (records of what actually happened in the data-gathering phase), and the stories and interpretations of co-researchers. Are both levels needed? Or is only the interpreted data from the co-researchers enough? Or can only the raw data be used?

Table 5 gives an overview of the research activities in co-research for contextual studies. The second column shows the actors in a research activity: some activities are performed by the lead researchers, some together with co-researchers and some by the co-researchers individually or together with their participants. In the last two columns the research phases are indicated. These phases differ for the lead researcher and for the co-researcher. For example, when a co-researcher is thinking of questions and helping set-up the research materials, this already elicits data of interest for the lead researcher.

Table 5: Research activities, actors and phases

RESEARCH ACTIVITY	ACTORS			RESEARCH PHASE FOR RESEARCHER	RESEARCH PHASE FOR CO-RESEARCHER
	LEAD-R	CO-R	PARTICIPANT		
Scope the research				Preparation	
Plan the project					
Define method					
Recruit co-researchers					
Set up materials				Gathering	Preparation
Training					
Recruit participants					
Facilitation					Gathering
Data capturing					
Data processing					
Interpret participant data				Gathering	Analysis
Communicate insights					Communication
Analyse data (co-r)				Analysis	
Make data useful for design				Communication	

4.6 EXPECTED BENEFITS AND CHALLENGES OF CO-RESEARCH

The considerations in the previous sections lead to expected benefits and challenges that form the basis of the framework and the point of departure for the case studies. The benefits are clustered in three aspects that derived from chapter 2: access, content and motivation. The main challenges are discussing a shared context and transferring data.

EXPECTED BENEFITS

Access

Since co-researchers are part of (or related to) the target group, their personal network is expected to be a great resource for recruiting participants. They have access to people and places around the situation the design project aims to improve. Because of their shared background and memories, I expect the participants to trust the co-researcher and speak the same language, making accessing them easier. For example, a child is more open to being interviewed by his/her friend at their favourite place to play than by an unfamiliar adult researcher.

Content

I expect that co-researchers can gather relevant user insights. I also expect that the conversations between peers generate richer, more personal, stories than conversations between a researcher and a participant because of their personal relationship. Next to that, I expect that the co-researchers develop a broader view on the research topic after hearing experiences of others, enabling them to share more diverse and deeper insights in their own experiences and opinions.

Motivation

Co-researcher is a more responsible and more intensive role than participant. I expect that it is also a more motivating role than participant because the children feel that they are taken very seriously. Other than in educational projects they are used to, in which they have to answer questions for their own development, a stranger comes to them with a question, really needing their help. If the co-researchers feel involved, share responsibility and see the relevance of their task, this is expected to be motivating. Also small steps in the process might increase motivation, like knowing that they have to deliver something the next meeting or that they have to report on the interviews. Next to that, I expect participants to be motivated more, because they are working with a personal friend.

EXPECTED CHALLENGES

Discussing a shared context

There are also challenges in employing co-researchers in contextual studies. Often, it is hard for people to express things that they do and experience on a daily basis. Things that they are used to often stay implicit, while designers get informed and inspired when these experiences are made explicit. This is an area of concern in user research in general. My expectation is that in co-research with children this pitfall asks for explicit attention and that it takes training to develop interviewing skills.

Transferring data

Another challenge will be the data translation between the co-researcher and the researcher. Interposing the researcher and the participant with a co-researcher may lead to the danger of losing out some of the things why we have participants in the first place. If the co-researcher does not understand what is important or asks the wrong questions, the risk exists that we are off worse. Again skills development, facilitation by the lead researcher and tools to help the co-researcher in each step of the way are expected to improve the data transfer.

4.7 REFINED RESEARCH QUESTIONS AND FRAMEWORK

The 4 areas of the initial co-research framework that are discussed in the previous sections are visualised in *figure 4.5*. These areas are directly linked to the refined research questions listed below. These refined research questions combine the questions stated in this chapter and are more specific than the questions from chapter 1.

Area 1 – The shared context of researcher and co-researcher

Which research competencies do co-researchers need? How can the co-researchers be trained and how do these competencies influence the contextual research?

Area 2 - The shared context of co-researcher and participant

What is the influence of a personal relation between the co-researcher and the participant on the research?

What is the difference between employing a co-researcher from the intended target group and one related to the target group?

Area 3 - The effects of co-research on access, content and motivation
In what way does the co-researcher affect the content of the research results?
What role does motivation play in co-research? What role does access play in co-research?

Area 4 - The research phases and activities within each phase
What part can co-researchers play in the different research phases?

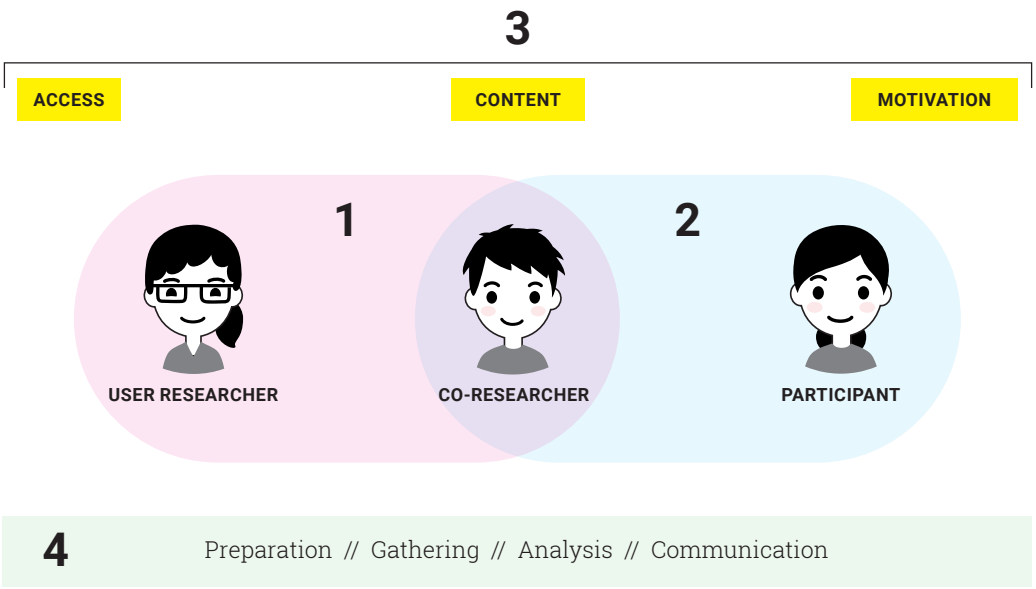


Figure 4.5: Areas of the initial co-research framework

CHAPTER 5 - FIELDWORK

5.0 INTRODUCTION

This work uses an explorative and design driven research approach. Explorative, in the sense that it aims to understand which factors play a role, and what kind of role, instead of isolating and verifying them. Design driven, because it aims to develop knowledge and create solutions in the form of tools and guidelines usable for design practice.

The used approach borrows aspects from action research (Reason & Bradbury, 2001), in particular that the author of this thesis has a double role of participant-researcher and thesis-researcher and that the full complexity of the case studies are observed. Another borrowed aspect from action research is the result driven way of researching in which knowledge gets value by its application. The research approach also includes elements from research through design (Stappers, 2007), since the research tools are designed iteratively and the considerations and reflections on these designs contribute to the research. And finally, the approach includes aspects of grounded theory (Charmaz, 2003), in the sense that the developed knowledge is grounded in data instead of in existing theory, which leaves openness for discovery.

To take the real-life context into account and learn from its richness, 11 empirical cases are conducted, involving different schools, children, researchers and topics.

All of these cases have a design goal and are restricted in time and budget, in most of them the data gathered in the case study led to a design. This makes the cases relevant because the gathered knowledge should be relevant for the design field.

The theory and knowledge to answer the research questions from chapter 4 is derived from data gathered during the cases by using the action-reflection loop (Sleeswijk Visser (2009), in which each study explores parts of the framework and a new study builds on the gained knowledge and explores it further. The framework from chapter 4 gives direction to the set-up of the cases; ***figure 5.1*** shows which part of the framework each study relates to.

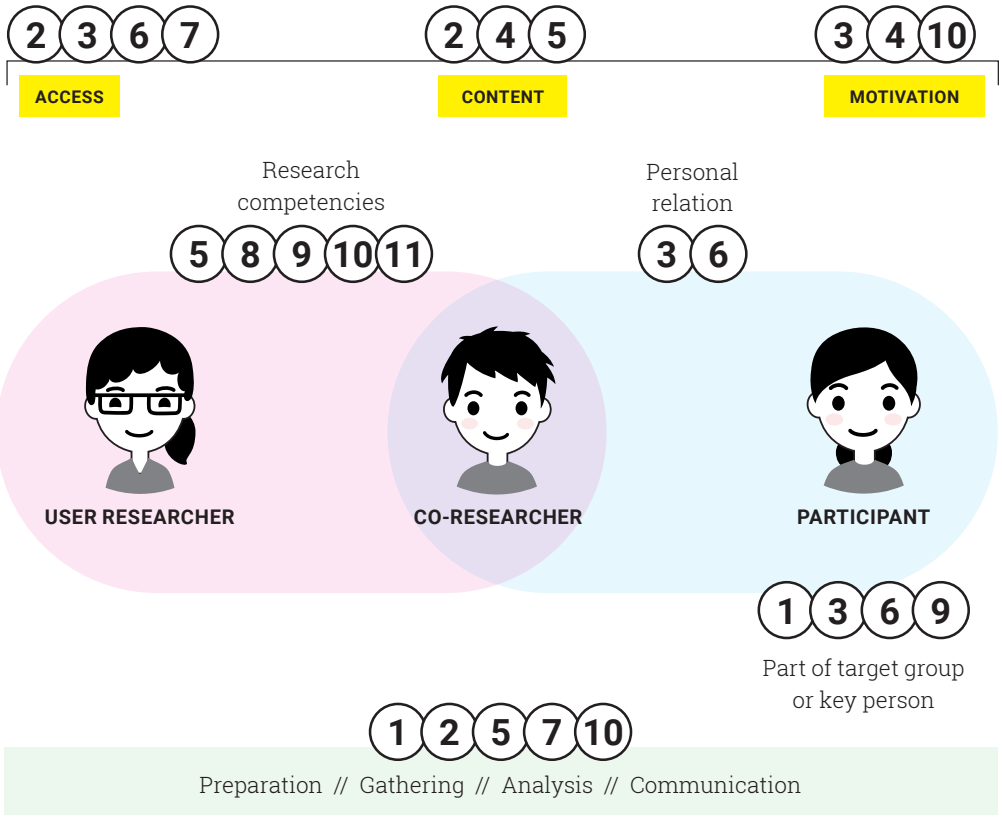


Figure 5.1 *The relations between the framework and the studies*

5.1 DATA COLLECTION AND ANALYSIS

The primary data collection during the case studies consists of video and audio recordings of the group sessions and individual interviews within the co-research process. All recordings are transcribed. Participating children are asked about their experiences and opinion at the end of each case. Materials developed by the children, such as filled-in research booklets and design ideas are collected or photographed. Where I conduct the case study as lead researcher, I log my experiences in a logbook. Where the lead researcher of a case study is a design student, experiences are communicated to me through progress meetings, research reports and a semi-structured interview at the end of the case. In these interviews the students reflect on their experiences, on the used method and materials and on how they

used the insights from the children in their design work.
All cases are analysed in a thematic way (see Appendix A for an example from case 1) by examining data and extracting core themes that can be distinguished both between and within cases. The analysis of the transcripts, materials, logbooks and interviews is done through open and axial coding by 2 researchers (Brynan, 2013); quotes and artefacts are selected, labelled and clustered, with special attention for the four key aspects of the framework: shared context, research activities, content and motivation. In total there are over 1500 pages of transcript, 210 hours of video and 170 hours of audio.

SAMPLING

Within the case studies different kinds of sampling are used for recruitment of the co-researchers and for recruitment of their participants. To recruit co-researchers for a case a mixture of convenience and purposive sampling is used, for example when asking schools nearby location of study to participate. The co-researchers recruit their participants through purposive snowball sampling, guided by the researcher and making use of their personal connections. A consequence of this choice is that there is a natural selection of participants: co-researchers choose participants they like, with whom they feel comfortable. This way only 'nice' participants will be reached, the grumpy old man living on the corner of the street is not likely to be interviewed. That will be taken into consideration when setting up a study and when interpreting its results. The affection between the interviewer and his/her participant can also have a positive influence on the research. A challenge of the snowball sampling, according to Biernacki & Waldorf (1981), is that: "The quality of the data being collected can be affected by many factors, including such problems as growing fatigue and disinterest among the interviewers or misunderstandings concerning precisely what should be explored in each new interview. Whatever the reasons, the data afforded through the chain referral sampling method must be monitored in a regular manner." Extra effort is spend on training research skills to co-researchers and on helping and guiding them in recruiting participants.

RESEARCH QUALITY

In qualitative case studies an important indicator for quality is validity, with both internal and external components (Bryman, 2012). In this work, internal validity is reached by triangulating the findings by using more than one source of data (e.g. transcripts, research booklets, filled-in research materials, video observations) and by involving at least two researchers in the analysis of each case study. The case studies are led by different researchers to lower the influence of personal facilitation style.

External validity is promoted by including 11 cases with different schools, co-researchers, researchers and topics. In terms of generalization, the variation in studies and their clear relation to the framework makes it more likely that in similar situations, similar effects will be found. The research in this thesis is therefore unavoidably partial and situated. I will reflect on the effects I as a researcher have on the research process and outcomes. All case studies are conducted in West-Europe. The insights cannot be generalized to other areas without further research.

5.2 ETHICAL DIMENSIONS

Children are considered a vulnerable target group, this means researchers should have extra attention and take precautions to make sure the well-being of children does not suffer from participating in the research. Some ethical issues occur in research with adults or children alike. But there are also differences, or amplifications, like being aware of the power relation between a researcher and a child (Christensen and Prout 2002). Co-research adds another level to the ethical considerations, since there are two types of researchers: the lead researcher and the co-researcher. Part of the work in this thesis is to explore ethical considerations in co-research for design purposes and to make them concrete.

There are different dimensions of ethics. Ethical committees often mandate procedural ethics. They give procedures on how to deal with f.e. informed consent, deception, privacy and protection from harm. Situational ethics deals with moments of ethical importance in the field. Rather than judging these moments according to absolute moral standards, situational ethics take the particular context in account when evaluating a situation ethically. Ellis (2007) adds relational ethics as a third dimension. Researchers who employ relational ethics value and respect the connection between themselves and the people they study. Ellis: "Relational ethics recognizes and values mutual respect, dignity and connectedness between researcher and researched. It requires researchers to act from their hearts and minds, to acknowledge interpersonal bonds to each other, and initiate and maintain conversations."

Relational ethics are particularly relevant to co-research because it raises questions like: How is doing research with intimate others different from doing research with strangers? Fischer (2009) adds that a cornerstone in relational ethics is "that the roles of teacher and student are assumed by both investigator and participant throughout the process of exchanging views" and that "a researcher brings expertise about the scientific method and extant empirical knowledge base and the prospective participant brings expertise about the fears, hopes, and wishes that the community brings towards the prospect of research".

Bradbury-Jones (2014) adds that overall, whatever the challenges: 'It is important that protecting children does not hinder the process of participatory research. This would be a paradox'. By looking at the different dimensions of ethics instead of only looking at procedural ethics, I create a broad base to ground ethical considerations on. This prevents ethics from becoming a set of rules that stand in the way of giving children a voice in innovation that concerns their own lives.

ETHICS IN THIS THESIS

The underlying motive of this research is involving children in the research process to ensure that future products better fit their needs. I will take care of the children that participate in our research and do my utmost best to make sure their participation has positive effect on them.

The second level of users (the participants the co-researchers interact with) adds extra complexity to co-research when it comes to ethics. The researcher does not interact with participants, only the co-researcher does. But to what extend do the co-researchers get involved in ethical procedures and considerations?

By reflection on ethical decisions in each case, I gain experience with the range of ethical choices and situations in co-research and develop an understanding of what kind of researcher I want to be and what kind of ethical guidance co-researchers need. Procedural ethics employ restrictions that can lead to unwanted exclusion of participants or deprive people from being heard or having influence. In my exploration I take the advice that Ellis (2007) gives to her students: "Strive to leave communities, participants, and yourselves better off at the end of the research than they were at the beginning." In co-research different roles merge and goals come together, relating to other advice from Ellis (2007): "As human beings, we long to live meaningful lives that seek the good. As friends, we long to have trusting relationships that care for others. As researchers, we long to do ethical research that makes a difference. To come close to these goals, we constantly have to consider which questions to ask, which secrets to keep and which truths are worth telling." This is the ethical starting point for the exploration in the fieldwork. Chapter 6 reflects on the case studies in relation to the three ethical dimensions mentioned above and gives more concrete insight in their application in co-research.

5.3 ELEVEN CASE STUDIES

Table 6 on the next page gives an overview of the studies. The first 5 studies are led by me, number 6 to 11 are led by design students as part of their graduation project, except for case 10 which is lead by another researcher. *Table 6* shows the topic of the user data, the areas of the framework the case focuses on, the actors in the case, an global overview of the research activities (in green the ones that were performed, in red activities that were not included in that particular case study). The table also shows the duration of the case, how the case contributes to the thesis research and related publications. *Figure 5.2* shows how the case studies are related.

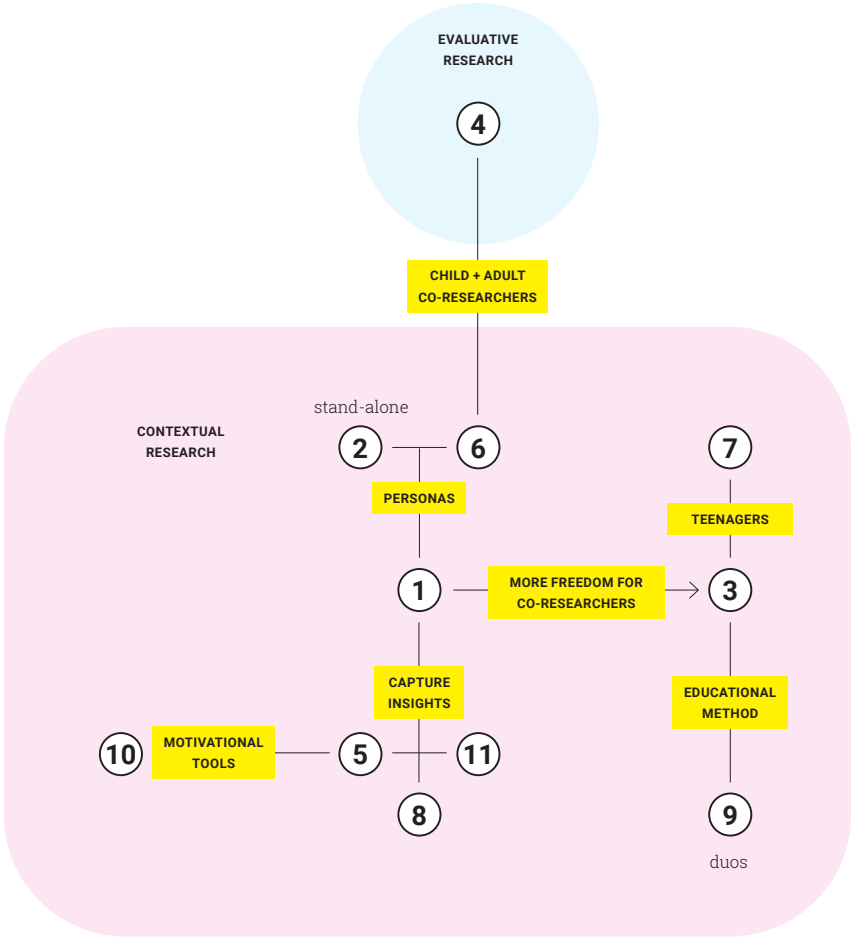
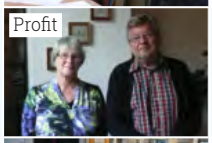
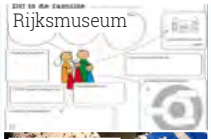
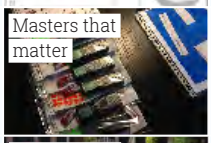
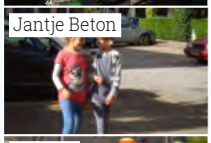


Figure 5.2 *Relations between the case studies. A line indicates affinity, the arrow indicates an order.*

Table 6 Overview of the case studies

	STUDY	RESEARCHER	CONTEXT	TOPIC OF USER DATA	FRAMEWORK
1	First exploration co-research	Fenne van Doorn	 Jan Vermeer school	Children and elderly being active together	1, 4
2	Personas as stand-alone research-tool	Fenne van Doorn	 Master course TU-Delft	Children's play	2, 3
3	Co-research as an educational method	Fenne van Doorn	 Hoeksch Lyceum	Quality of life for elderly people	1, 2, 3
4	Co-research in concept evaluation	Fenne van Doorn	 Profit	Evaluation of submitted design concepts	3, 4
5	Capturing interviews with peers	Fenne van Doorn, Mathieu Gielen	 Max Havelaar school	Children's personal possessions in public space	1, 4
6	Co-research within and outside of families	Kim Kaars	 Rijksmuseum	Family interaction and museum visits	2, 3
7	Interviews show what children are like	Johan Langedoen	 Masters that matter	Food routines, activities after school	3
8	Capturing children's routes	Marlies Bouman	 Jantje Beton	Play routes	1
9	Co-research working in duos	Remke Klapwijk	 Galjoen school	Green school-yard	1, 2
10	Testing the guidelines	Britt Luijpers	 Profit	Rebellion in play	3
11	Co-researchers interviewing each-other	Elena Marengoni	 International school Delft	Books and the school library	1

OTHER ACTORS	DURATION	THIS STUDY	PUBLICATIONS
Co-researchers: 20 children (9-12) Participants: 20 peers + 20 grandparents	7 weeks	Is a first exploration of the co-research process. Compares peers and key persons as co-researchers.	Paper CHI, Paper DRS//Cumulus Paper Journal of design and technology education
Co-researchers: 30 children Participants: None 18 design students	2 weeks	Finds out if personas work as a stand-alone research tool.	-
Co-researchers: 26 children (11-13) Participants: 50 elderly	7 weeks	Gives more freedom and ownership to co-researchers.	-
Co-researchers: 2 children + 2 students + 2 elderly Participants: 4 children + 4 students + 4 elderly	4 weeks	Finds out with 3 different target groups if co-research is useful for concept evaluation.	Paper IASDR
Co-researchers: 28 children (8-9) Participants: 62 children	6 weeks	Uses video as a tool for co-research.	Paper IDC
Co-researchers: 5 children (8-12) + 4 parents Participants: 9 children and 9 parents	6 weeks	Works with co-researchers to get insight in family interaction	Master thesis Kim Kaars
Co-researchers: 7 children (9-12) Participants: 14 children (9-12)	4 weeks	Uses co-research as a method to talk about sensitive subjects.	Master thesis Johan Langedoen
Co-researchers: 10 children (7-8) Participants: 10 children (6-9)	6 weeks	Tries out different recording devices: Photo, film, audio, drawing	Master thesis Marlies Bouman
Co-researchers: 22 children (7-11) in duos Participants: 10 children and 4 teachers Facilitator: teacher	3 weeks	Works with duos of co-researchers, facilitated by a teacher.	-
Co-researchers: 8 children (8-11) Participants: 14 children (7-11)	6 weeks	Tests the co-research guidelines	Master thesis Britt Luijpers
Co-researchers: 4 children (10-11) Participants: 8 children	4 weeks	Gives co-researchers the role of translators and tests the guidelines.	Master thesis Elena Marengoni

CASE 1: FIRST EXPLORATION WITH CO-RESEARCH

Co-Researchers:	20 children (9-12)
Participants:	20 peers + 20 grandparents
Process:	Intro session, booklets, training session, interviews, feedback session, idea session
Topic:	Children and elderly being active together
Location:	Primary school in Delft

The description of this case study is based on the following publication:
Doorn, F. van, Stappers, P. J., Gielen, M., (2013) 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. ACM

INTRODUCTION

In this case study, twenty children aged 9-12 conduct interviews with peers and with their grandparents. The research phases described in chapter 4 are transformed in concrete co-research steps and tried out for the first time. The focus of this case lies on the research competencies and activities of the co-researchers. Can children act as co-researchers in contextual design research? Which research competencies do they need? How can they be trained? What activities can they do in the different research phases? These questions relate to areas 1 and 4 of the framework.

USER INSIGHTS NEEDED

This study is conducted as part of the ProFit project and investigates wishes and needs related to children and elderly being active together. The user insights from this study are meant to be used for the development of new concepts in the FieldLab in Delft. To gather

insights that fit the local context, the participating co-researchers are recruited from a school nearby the FieldLab, which increases the chance that they familiar with and able to visit the FieldLab. This direct link to the location is expected to increase the relevance for and thereby the motivation of the participating children.

PROCEDURE

In this case, the co-researchers meet four times with the researcher and conduct two interviews. In the preparation phase the lead researcher recruits a class from the Jan Vermeerschool in Delft, plans the research process and designs materials.

In the first meeting with all 20 participating children together, the lead researcher explains the project. After that, all children sketch ideas for new playground equipment, to be used by children and elderly together, and discuss them in the group. The children are than divided into groups of four or five, focusing either on peers or on elderly. Within these small groups they think of questions to ask their target group and give input for the development of a research booklet.

The researcher takes the input from the children and develops two different research booklets (one for interviewing peers, one for interviewing grandparents). These booklets are a mix of creative assignments and interview-questions the children came up with and are meant as conversation starters and a way to structure the interviews.

During the second meeting with the researcher, each small group of children is trained in interviewing skills and practices the use of the research booklet by interviewing each other. After this meeting some final adjustments are made to the booklets.

With their booklets and an audio-recorder, the children interview their peers or their grandparents individually.

Subsequently to conducting the interviews, the small groups come together for a feedback session in which they discuss their results. They explain and compare the notes in their research booklets and, led by questions from the researcher, share their experiences. After this discussion the children fill in templates of personas as a kind of summary of different kinds of participants that they have encountered. By making the personas, the pupils integrate information from the different interviews into one story. The process of filling in the persona is done within the small groups and every group is led by the researcher.

In a final creative session, the children think again of ideas to place in the new playground, but now with the use of their personas and their gained knowledge about the target group. The whole class participates in this session at the same time and new groups are formed to generate ideas together, each group included pupils with knowledge from the two different target groups.

RESULTS AND DISCUSSION

Overall the children were enthusiastic and motivated throughout the whole process. They felt connected to the project, felt ownership and wanted to stay in touch.

> ***Girl:*** *"If the playground is opened, can we be the first to get in?"*

This section discusses insights gathered in this study that relate to the research competencies of the co-researchers and the research activities they performed.

Research materials

During the first session the children gave input for the development of the research booklets. It turned out to be hard for them to come up with questions individually. By making it into a group process and challenging the group to come up with a certain amount of questions, they let loose of their hesitations, inspired each other and came up with more questions. Another way to speed up the process was to let the researcher do the writing, steered by the children's input, this went much faster than when the children wrote themselves.

With the input from the children, the researcher developed two different research booklets (one for interviewing children, one for interviewing grandparents). In the second session the children came together to give their feedback on these research booklets. They were mostly concerned with the appearance of the booklets.

> ***Boy:*** *"This booklet looks really cool.... I'm already looking forward to doing the interviews!"*

They did not look at the content of the questions very carefully; there was an overall attitude of just diving in, experiencing en seeing what would come out. The main improvements the children came up with were on readability, word choice and practical use, like how much space is left to write an answer.

> ***Boy:*** *"I don't really have adjustments, we are just going to do it, just give it to them!"*

One content adjustment the children suggested was the addition of a blank space for a question of their own choice, which they could come up with during the interview. Although not all children used this question during their interview, it added to the feeling of ownership and occasionally gave an interesting insight.

Research Training

The training session, to prepare the children to conduct interviews on their own, consisted of three parts: discussing the interview booklets, sharing interview tips and a rehearsal of the interview on group members. This last part was the most useful; they learned by experience and only when practicing did the children show if they really understood what to do. During the rehearsals, some children started to appreciate the research booklets:

> ***Boy:*** *"This booklet has enough in it to discover a lot. Some people need a lot of questions to get to know one thing. With this booklet... after two, three questions you know something already."*
>
> ***Girl:*** *"I think sometimes you can spend an hour on only this first question."*

One of the interview tips during the training was to ask the participants to think aloud. The children picked up this skill very quickly and used it during the training as well as during the actual interview. Another tip was to use a pause every now and then to challenge participants to share even more. This tip was recognizable for several children. "Sometimes when somebody asks me a question, I don't know the answer. But then a few moments later I remember again!" It is valuable to relate the interview skills to the children's own experience and then have them practice them on each other.

Half of the groups interviewed friends their own age and the other half interviewed their grandparents. Practicing the interviews with friends went better than practicing the interviews with grandparents, because the children answered the questions as themselves. So, these answers were already valuable for the actual research subject. When rehearsing the interview with grandparents, the children pretended to be elderly. At first there was much giggling and funny acting but along the way it was striking to see that they realized how little they actually knew about their grandparents and started to become curious about what the real answers would be.

Social group

The co-researchers were divided in small groups of 4 or 5 children. During the training they gave each other suggestions on how to improve their interviewing skills. The groups worked very seriously and when one of the children misbehaved within the group, the rest of the

group reprimanded him/her. There was a lot of discussion within the groups, so the first data about the topic of interest (being active) can already be collected during these group sessions. Because of the secure environment the children even discussed sensitive subjects, such as mischiefs. Some of the children knew each other well, which gave another dimension to the practicing of the interviews; they could add to each other's answers and dive deeper into some of the subjects.

> *Question from booklet: Whom do you play with and what do you do?*
>
> ***Girl** answers the question*
>
> ***Boy to girl:** "I thought you also play most with Bobby right? Isn't that true?"*
>
> ***Girl:** "Yes that is right, I play a lot with Bobby, my sister, I didn't think about that, I thought you meant friends not family."*

During the training the children were asked to indicate how many interviews they committed to do. By asking this within the group, they motivated each other to do more than they might have done if they had been trained alone.

Data gathering

When conducting the interviews, sometimes a question was perceived as more important than the actual answer. For example in one interview, between a grandfather and a granddaughter, the grandfather attempts an elaborated and interesting story in an answer to the granddaughter's question about which places on a shared map the grandfather visits, but the granddaughter interrupts the story several times asking:

> *"Yes OK, but how far is it from your house? How many meters? Where shall I place it on the map?"*

Professional Role

Most children take their role as researcher very seriously. The use of a voice recorder emphasizes this role and adds to the feeling of professionalism. Getting children in this serious "mode" is useful for research purposes. Some of their participants on the other hand, are not that serious and have to get used to their friend or relative in this new role. An example of a participant who uses this change of roles to critique his friend is the following; on the question: "What do you do when you come home from school?" he answers:

> *"I would like to play with Jasper (interviewer), but he almost never has time."*

On a few occasions a child fell back into an old role, for example when a grandmother was supposed to make a small collage about the meaning of movement during her life. In the end the granddaughter was making the creative assignment, with some suggestions from her grandmother, just as they would tinker normally.

Interview Skills

A lot of follow-up questions were asked by means of examples, such as: *"What do you do when you get up in the morning? Shower? Put on clothes? Have breakfast?"* These questions seem leading, but this was their way of discussing; the children felt comfortable to reject examples from peers. Although not all follow-up questions were relevant ("*What do you put on your bread during lunch?*") some expressed a lot of insight in the research topic ("*What's the difference in moving in your life in summer and winter? If football wouldn't exist, what would you do?*"). Most of the times the questions the children asked were related to activities.

The skills that developed during the practice interview in the training session were not always present in the actual interview. In situations in which the children forgot the information from the training two things occurred: some children gave their own interpretation to questions they did not understand anymore which was really insightful in their way of thinking and led to interesting conversations. But some children just skipped questions they had trouble with, ending up with no data on these questions. Something similar happened, when the answers of participants were explained in the feedback session, the children sometimes didn't remember what their participants had said or had meant by certain drawings.

External factors

Some of the children conducted their interviews under time pressure. To set-up an interview, children depended on their parents. Interviews were often combined with a visit to their grandparents or took place when friends came to visit. This made the interview controlled by plans of others. In some cases the child started the interview close to bedtime and had to rush in order to obey his/her parents, a few children tried to do all interviews on the night before the feedback session.

Another external factor was other people who are present in the room in which the interview is conducted. They were sometimes helpful, for example one mother gave suggestions in the background. But they could be a burden as well; one interview took place in a room with several people and because of the voice recorder, everybody in the room had to be quiet. When the interview was over, the child pushed the stop button a bit too late and on the recording you could hear everybody laughing and talking, glad that it was over and they could have their normal conversations again. These kinds of situations can put pressure on the interview.

Official/unofficial interview

As said before, the voice recorders added a level of professionalism to the interview. It also had another effect: Next to the "official" interview, during which people talked into the voice recorder loud and clear, there was an "unofficial" interview, in which the interviewer whispers comments or instructions to the participant. These comments were sometimes interesting and give insight into the relation between interviewer and participant. In the official interview the role of interviewer is kept high, in the unofficial interview the old roles pop up again.

Reporting skills

Druin (1999) found out that children have a difficult time taking notes during interviews and they prefer to combine drawings with small amounts of text. In the research booklets that were used in this study there was room for text and visualizations. Because writing and drawing took a lot of time and effort, elaborate answers from participants were put down in the research booklet in only a few keywords. When looking back at these keywords a few days later it was hard for some children to come up with the original story again.

> ***Girl:*** *"I'm not very good in writing, I will ask the participant to write. But can I do it with my mother then? Because I can not write very clear."*

> ***Boy:*** *"I did one with my two neighbours together, that went well, but I did not write down a lot."*

Sharing personal stories in the feedback session

When asking the children how the interview went they all answer: "It went well". Only when asking further questions, a more elaborated explanation about their experience is given.

Some insights about the personal life of the participants, reported by the children, were very meaningful or personal. An example from a boy who interviewed his friend:

> *"Usually he had very quiet, calm thoughts. But sometimes, when it comes to being active, he panics; he does not know what to do. When we were playing tag he was captured, he was just standing there. Then we freed him and said what he was supposed to do, but he just stood there, panicking, not knowing what to do."*

We can speculate whether the boy from this story would tell this anecdote to a "normal" researcher. Although the co-researchers shared this knowledge during the feedback session, it was not obtained during the interview with this particular participant but during earlier experiences. Doing the interview made it easier for the co-researcher to access and share other relevant memories about his participant.

Parents and grandparents took the children, in the role of researcher, serious enough to share their concerns with them. One grandparent told his grandson that he moves a lot because he is scared of not being able to do so in the future. He wants to stay fit in order to make sure that he will be able to live independently for as long as possible. One father confessed to his daughter that he actually hates running, but he does it because he thinks he is fat.

Persona templates

The persona templates (***figure 5.3***) elicited useful information, the children thought the templates were inviting and wanted to start right away at the beginning of the feedback session. When making the personas and combining several participants into one character, some children were more comfortable to share their experiences than without the personas. Some children feel responsible for their participants; sometimes friends or siblings were not very serious during the interview and the children feel like apologizing for that, but on the other hand they don't want to betray their participant or put them in bad daylight. When using personas they didn't have to talk about a specific participant so they didn't feel like betraying this person and the insights were more anonymous. One example is when the children were filling in a persona template about an old grandfather and one boy added:

"He moves in order to meet people, he is kind of lonely."

It seemed easier for him to say something like that about a fictive character than about his own grandfather. By making the personas within small groups, everyone could add to the discussion in their own time, this gave an energetic and positive atmosphere. It was also more efficient when the researcher facilitated the discussion and did the writing/drawing.

It turned out that the children were capable of comparing persons very well; they are able to see the differences and similarities between people and to make a short description of a certain character. This relates to a note in the paper of Druin (1999), mentioning that a quality of having children in the intergenerational research teams was that they were good at summarizing data in a way that enabled adult researchers to see something they had originally missed. In the end, the descriptions of the personas were much more elaborate than the description of the individual participants.

Overall some strong benefits of using personas were that they create the opportunity to use input from the research and earlier experiences and they create distance from the actual participants. The title of the persona was a better way to talk about the character than the real name of the participant. Finishing the personas marked the end of the research phase. At the end, one girl wanted to fill in a persona about her own grandparents to keep at home. Like memorabilia from the research, feeling proud of what she had achieved.

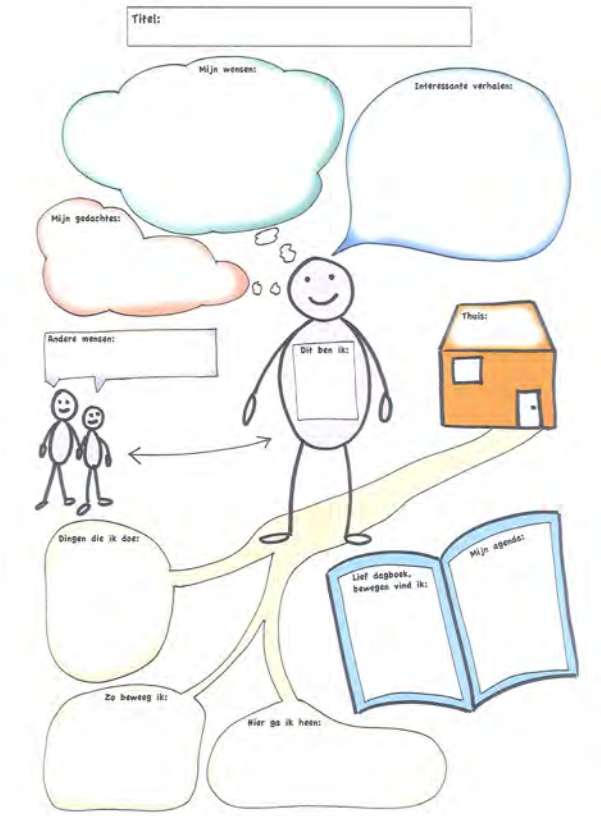


Figure 5.3 Persona template

Difference in skills

The level of skills of the children in this study varied, mainly because of age differences. This difference was partly overcome by mixing the ages within the groups, so younger children learned from the older ones. One example of the difference in thinking level can be seen in the following answers from two different children:

> ***Researcher:*** *"OK, what would this person write, dear diary, I think moving is…".*
>
> ***Boy (9):*** *"Super cool! Supersonically cool!"*
>
> ***Girl (12):*** *"A lot of fun because you can see everything around you. When you sit alone and still in your room you don't experience much."*

Planning

Children, aged 9-12, turned out to be very dependent on their parents. They are often not aware of time or planning; their parents decide what to do. They are living in the now, they know what they are going to do today, but it is hard for them to think about next week or even further ahead. That makes it hard to plan or make agreements. The best way to cope with this might be to let them conduct the research quickly after the training. Another reason to plan the sessions close to each other is to make sure that the training or an answer from a participant is still in their minds.

Not sharing 'obvious' information

As said before, the collaborating children knew their participants well. A concern beforehand was that because they share a lot of context they might talk about things the researcher does not understand. During this case study that happened only once: two children were discussing about going to the "lighthouse", the researcher didn't know what that was. Luckily this conversation took place within the group session and the researcher was there to ask about it, but if it happened during the real interview he might not be able to ask. In none of the interviews this was encountered. There might be topics that are not discussed, which are unnoticed by the researcher because they seem obvious to the participants although they are relevant.

Super participant

In chapter 4, the question was raised if using co-researchers to conduct research would turn these co-researchers into "super participants", who know more about their own needs, wishes, desires and activities by studying others. During this case study some indications for this were found: while thinking of appropriate questions during the first session, discussions between the co-researchers were surprisingly insightful; as a sidetrack some children talked about their own experiences related to the topic in an informal way. Some interesting insights about "being active" came already from this. Taking on the role of researcher changed their mindset; they were very serious, which made them useful sources themselves. Conducting the interviews made it easier for the children to access knowledge they already had about their participants and the research subject. Next to gaining new knowledge the children were able to access existing knowledge.

Content of the results

In this study I did not compare the gathered insights to the outcomes of other contextual user research methods. However, we did see a positive development of the co-researchers during the process; we feel that the ideas from the final creative session were more empathic towards the target group than the ideas from the first session. One signal for that is that the drawings from the first session often didn't include any persons. In the final session

almost all groups draw persons and they explained more about the roles and wishes of these different persons.

CONCLUSIONS

This study has shown that children are able to work as co-researchers in research activities in the design process and has yielded insights in some of the merits and constraints of using this approach. The training was important for improving the interview skills and to get to know the children and their point of view. Because the children felt responsible as researchers, they were focused and worked seriously. The gained insights were personal and the persona templates proved to be a useful tool. During the assignment of creating personas, different kinds of knowledge came together and were shared in an informal way that led to rich characters and insights. During the sessions with the lead researcher and other co-researchers, the children thought about the research subject, discussed it and gave insights in both their own and their participants' life in an informal way.

Improvements

When using this method in applying children as researchers, a few things can be improved: The research booklet should provide guidance on subjects like explaining the research and getting the consent of the participant. The booklet should also be clear on what the co-researchers should fill in together with the participant and what they should fill in on their own. Overall, it must be easy to understand how to complete an assignment and what kind of answer is expected. If there are any doubts, some children don't fill it in at all.

Writing is hard for most children, during the interviews most of them only wrote down a few keywords. Maybe another way of reporting would work better, like audio reporting.

The children had a clear goal in mind while going through each step of the process: thinking of ideas for the new playground. This goal oriented view made the children very idea driven and not focussed on stories from their participants. Overall the process should be less idea minded and more about storytelling, about getting a closer look at others. A first step to reach this goal could be to eliminate design-oriented assignments from the research booklet.

Practicing the interviews on each other was the most important part of the training session; this is when the children really grow and develop their skills. Next time the rehearsal will cover the whole process of the interview: from the beginning of the interview, with explaining the interview and getting the participants' consent, to the closing off. They should also practice with the actual voice recorders.

During the training the children were very motivated by encouragements, positive stimulation and compliments. These made them feel confident. During the interview itself some of the children were a bit insecure, maybe the interview materials could help the co-researchers in the same positive way the training supported them.

The most important part of this collaboration process was the way the children adopted the role of researcher. They developed another attitude, felt ownership and became more serious. In a next study this role could be more enhanced. Opportunities to do so could be: giving them more professional tools or rewarding them at the end of the process with for example a certificate.

LINKS TO OTHER CASES

- For more about the use of personas see: case 2+6
- For more about ways to report the co-researchers' findings see: case 5+8+11
- For a more open and child-driven approach see: case 3

CASE 2: PERSONA TEMPLATES AS A STAND-ALONE RESEARCH TOOL

Co-Researchers:	18 students
Participants:	30 children
Process:	Filling in persona templates, followed by a creative assignment
Topic:	Varied subjects chosen by the students
Location:	Science Centre Delft

INTRODUCTION

The persona templates in the feedback session of case 1 helped the co-researchers to express and combine their findings. These templates existed of a character that the children could adjust and around the character areas of interest that could be filled in. With these templates the co-researchers were able to define rich fictive characters that combined characteristics and personal stories from multiple people. After the study I wondered if children could have filled in these persona templates without doing interviews, since they build on knowledge of people they are familiar with. Therefore persona templates were used in the current case study as a stand-alone research tool.

18 design students from the master course Design for Children's Play (developed by Mathieu Gielen) at the TU Delft, , used persona templates with children to get insight in the topic of the students' design assignment from the children's point of view. The students developed persona templates themselves and facilitated a small group of children (2-3) in filling them in with their peers in mind.

PROCEDURE

First the procedure and results from case study 1 were presented to the group of master students. In duos, they developed persona templates for children to fill in that fit their design

goal. To capture their prejudice and pilot test their templates, the students started with filling in their persona templates themselves as being a child.

After that, a session was organized in which each duo of students could interact with a group of 2-3 children. The students started their session with discussing their target group and asking if the children knew people that would fit this target group. With these people in mind, the children discussed and filled in the persona templates together, facilitated by the students (***Figure 5.4***). As a final step the children designed a game or toy that would fit one of the personas they defined.

Figure 5.4 *Children filling in personas*

REFLECTION

The students had a hard time facilitating their groups of children. The atmosphere in most groups was chaotic and competitive. Children were trying to impress each other with extreme fantasies. Most of the personas they came up with were not related to real people or real experiences, for example a farmer with 50 pigs or a ninja grandfather. Especially the boys had a fun time thinking of bizarre characters and ideas, for example the TNT tree and atom bombs in ***figure 5.5***.

The attitude and results in this assignment were very different from the experiences with the persona template in case study 1. Doing the interviews sensitized the children and made them able to access knowledge they already had about their participants. Without

the conduction of these interviews and preparation in the kick-off and training sessions, the children were not able to contribute meaningful knowledge in persona templates. They didn't feel ownership like in case study 1, this assignment was just something fun for them, a school outing.

Figure 5.35 Extreme persona

CONCLUSIONS

This study showed that without sensitizing children through the conduction of interviews and giving them the role of co-researcher, the persona templates did not help children to express rich information about themselves or peers or combine existing knowledge.

LINKS TO OTHER CASES

For more about the use of personas see: case 1+6

CASE 3: CO-RESEARCH AS AN EDUCATIONAL METHOD

Co-Researchers:	26 children (11-13)
Participants:	50 elderly people (65+)
Process:	Intro session, booklets, training session, interviews, feedback session, ideas session
Topic:	Quality of life of elderly people
Location:	Secondary school in Oud-Beijerland

INTRODUCTION

In this case study, 26 children (11-13) in their first year of high school, acted as co-researchers to investigate the quality of life of elderly people. For other case studies, I contacted schools to participate in a co-research project. But this time, the school contacted me to do a project with their pupils. The school was participating in the First Lego League challenge in which children thought of ways to improve the quality of life of elderly people. The teacher had heard positive experiences from the school in study 1 about co-research and wanted to conduct co-research with his pupils to prepare them for the Lego League Challenge. The school participated in this project because they wanted their pupils to develop empathy for elderly people and to stimulate them to think of solutions for problems that elderly people face.

In this case study the children were free to choose their own topic and focus. They thought of their own questions, designed and made their own research booklets and used the insights that came out of their research in their own design process.

In this study I investigate how this increased amount of freedom and responsibility of the co-researchers influences the co-research process and how the end results differ from the user-researcher driven cases in which the topic was pre-determined.

USER INSIGHTS NEEDED

Designing something to improve the quality of life of elderly people is a broad and abstract assignment. The children conducted interviews in order to get to know elderly people and get insight in their wishes and needs. What do elderly people do? What happens in their everyday life? What are things they enjoy and problems they face? The children could define their own research focus and questions. Some investigated for example medicine use, others social connectedness and others the use of computers and social media. The insights from the interviews and feedback sessions are used in a creative session to come up with ideas to submit in the Lego League competition.

PROCEDURE

The first session took place at the Hoeksch Lyceum. It started with a presentation and discussion about what research is. After that, the 26 children were divided in 7 groups. Each group had prepared a topic they wanted to focus their research on and made a mind-map to detail their research theme and think of questions to ask. As homework each group made a research booklet with assignments to answer the questions they came up with.

One week later, I met each group separately to discuss and improve the research booklets they made. When they were satisfied with their booklet, they received tips on how to do an interview and practiced interviewing with their booklets on each other. These practice rounds led to more improvements to the booklets. At the end of the session, the children decided whom to ask as a participant and they received templates to fill in after each interview to do a first reflection.

Within the next two weeks, each child conducted 2 interviews and recorded them with a device of their own, for example a mobile phone that belonged to their parents. The children were instructed to do the interviews with familiar people. All children conducted the interviews with grandparents or neighbours. Except for two boys who teamed up and went to an elderly home to interview a lady and a couple they did not know before. After conducting the interviews, each group came together for a feedback session to discuss their results and fill in a persona template.

In a creative session one week later, the groups used their insights and different creative techniques to develop ideas for the Lego League. Subsequently to choosing one idea and developing it further, each group presented their idea to the rest of the class and answered questions. After the creative session the groups further developed their ideas and submitted

them it the Lego League competition. 2 teams won prices (1st and 3rd) in the regional finals with their research and ideas and they went through to the Benelux final.

RESULTS AND REFLECTION

This case study showed that children aged 11-13 are able to set up and conduct their own user research under guidance (explaining the steps and giving feedback) and use their findings in ideation. They are able to communicate with participants in an open way and focus on their needs. They are good at asking questions and received personal and serious answers from their participants. Grandparents were happy to participate. One grandfather for example grabbed photos and attributes during the interview to illustrate his story.

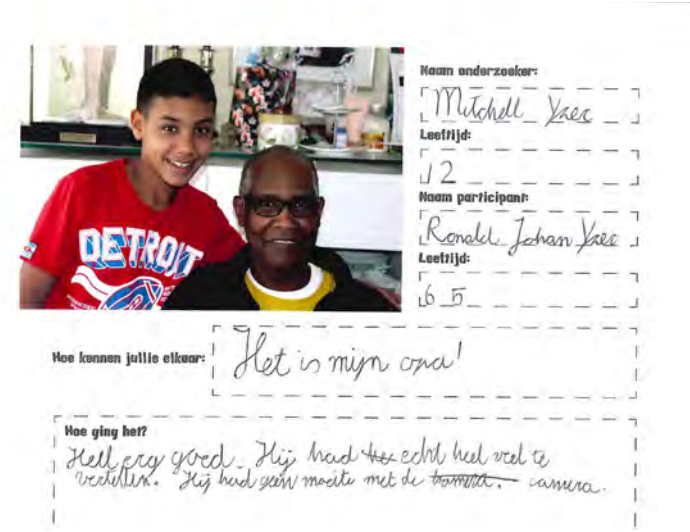


Figure 5.6 *Co-researcher interviewed his grandfather*

The children used their personal network to recruit participants that were close to them (e.g. ***figure 5.6***). During the project they realized that these participants face problems they did not think of, for example loneliness or problems with medicines or computers. The children were eager to think of solutions and ideas that can help elderly to overcome these problems. Their ideas were not very innovative but full of empathy. For example a fun alarm clock as a reminder to take pills (***figure 5.7***) or a gaming platform for elderly called "Play and talk" (***figure 5.8***).

Figure 5.7 *Braindrawing by children*

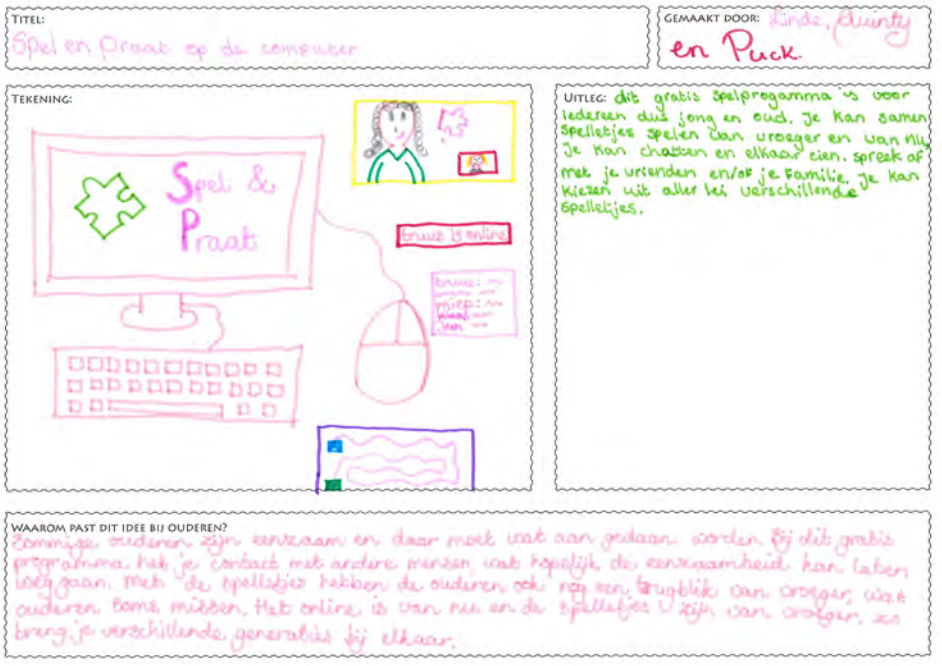


Figure 5.8 *Idea from the children: gaming platform for elderly*

Choosing a research topic and questions

The children had freedom to choose their own focus and research questions within the broad topic of improving the quality of life of elderly. In a first brainstorm they shared prejudices about elderly and it turned out that it was hard for them to let these prejudices go. For example one group discussed that elderly may feel lonely and they wanted to research that by asking questions about loneliness. Choosing a more neutral research topic, like social contact, was hard for them.

In some cases children projected their own problems on elderly. For example the group that focused on taking medicines. They themselves hate taking pills because of the taste and size and they assumed that these were the biggest problems elderly faced as well. So they incorporated a checklist with different flavoured pills and asked which ones the participant would like: strawberry, banana, chocolate etc. Overall, each group put a lot of effort in the content and layout of their research booklet, making them by hand or on the computer (***figure 5.9***).

Figure 5.9 *Research booklets made by the co-researchers*

Committed group work

The groups worked together like a team; they made the booklets together and felt responsible for the outcomes. If a question did not work out in the first interview, they changed it for the next interview a teammate was going to conduct. Every child conducted the two interviews within 2 weeks. They participated equally in the sessions and there was an open and serious attitude. Except for the creative session, in which some children wanted to push their ideas. For the teachers and parents who were supervising the group during the creative session it was also hard to guide the groups without pushing their own ideas.

Freedom to choose your participants

The children discussed in the training session which participants they were going to ask for their interview. Two boys decided to change the plan after the session and interviewed elderly they were not familiar with in an elderly home (***figure 5.10***). Luckily this worked out fine and the interviews they did were very good because their participants enjoyed the conversation and gave very personal insight about medicine use and life in an elderly home.

Figure 5.10 *Boys interviewing elderly they did not know*

Freedom versus Design goal

The difference between this case study and other case studies in this thesis was that the children could decide what they wanted to focus on in their research and develop and produce their own research booklets. As a result, the children in this study were very motivated and they felt ownership and loyalty to their group. However, the overall results from the different groups do not contribute to the same design goal and it is impossible to steer the children in a fixed direction. In a real design process his would be problematic.

Next to that, thinking of ideas to submit to the Lego League competition as an end goal sometimes led the children to asking solution focused questions instead of experience-focused questions. The personas however, in which the children took a broader view on the characters they encountered are more personal and detailed than in any of the other case studies (***figure 5.11***).

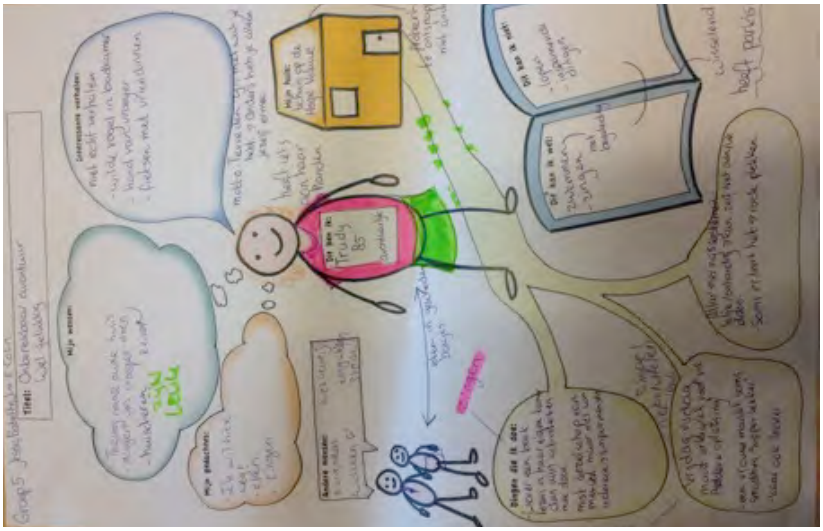


Figure 5.11 Filled-in persona template

CONCLUSIONS

From the perspective of the thesis research, there are three main conclusions:

Firstly, even though the freedom in this case study leads to motivation and ownership, this approach yields scattered outcomes that are not focussed around a certain research topic This makes the outcomes less useful for a design project. The children needed guidance in choosing a topic to focus on and setting up the research.

Next to that, the interviews with family members brought the co-researchers and participants closer together. Understanding problems of people close to them made the children eager to fix these problems and they felt proud when they thought of a solution.

Finally, It is important to tell the children that they should do the interview with people they are familiar with and are not allowed to go to strangers because of safety reasons.

LINKS TO OTHER CASES

- For more about the use of personas see: case 2+6
- For more about co-research as an educational method see: case 9
- For more about co-research with elderly participants see: case 1
- For more about co-research with teenagers see: case 7

CASE 4: CO-RESEARCH IN CONCEPT EVALUATION

Co-Researchers:	2 children + 2 students + 2 elderly
Participants:	4 children + 4 students + 4 elderly
Process:	Training, interview, feedback
Topic:	Concept evaluation within ProFit
Location:	Delft and Eindhoven

The description of this case study is based on the following publication:
van Doorn, F., Stappers, P.J., Gielen, M., (2013). Friends sharing Opinions: Users become Research Collaborators to Evaluate Design Concepts. Proceedings of the 5th International Congress of International Association of Societies of Design Research

INTRODUCTION

This study explores co-research in concept evaluation with 3 different target groups: children, students and elderly. I will investigate if co-researchers are able to obtain valuable evaluations of design proposals from and with their peers and if the exploration of other peoples' opinions will help them to form and express their own opinion. These investigations relate to areas 2 and 4 of the framework.

Six co-researchers participated in this study: four in Delft and two in Eindhoven. These co-researchers represent the three target groups of the FieldLabs in Delft and Eindhoven: two children (aged 9 and 12), two students (aged 20 and 21) and two elderly (aged 65 and 74). Each co-researcher interviewed two peers from the same target group and reported about their findings in a feedback-session. A total of 18 people were involved in this study, either as co-researcher or participant. In this case study the co-researchers from three different age groups give insight in the generalizability of the approach.

USER INSIGHTS NEEDED

This study was conducted to evaluate designs from the Profit design competition from a users' point of view in Delft and Eindhoven (The Netherlands). In both cities, co-researchers performed interviews with peers to gather more opinions and to ground their own opinion. These opinions were input for juries to help them decide the winning concepts, which will be placed in the FieldLabs in Delft and Eindhoven.

PROCEDURE

In a first meeting, the co-researchers were introduced to the project and their role as researcher. They were instructed on how to perform interviews with peers and received voice-recorders and two research booklets. The purpose of the booklet was to guide the co-researcher in the course of the interviews by explaining the aim of the research, giving interviewing tips and providing structured questions. During the interviews the co-researcher wrote down the answers to the questions in the booklets. The booklet started with questions about the relationship of the co-researcher and his/her participant, followed by the explanation of the 5 concepts on sheets placed in envelopes on the left, and questions about the concept designs on the right pages (***figure 5.12 left***). The booklet ended with assignments requiring a comparison of the concept designs, such as "Put the concepts in order of preference", "Which one fits you best and why?" or "Which one do you think others like best and why?"

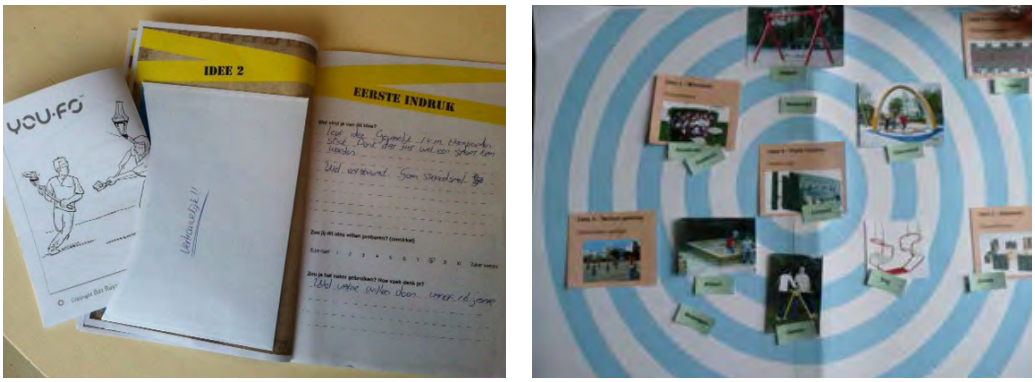


Figure 5.12 *Pages from the Research Booklet (left) bulls-eye with concept and words (right)*

Each co-researcher conducted interviews with two peers. After 1 or 2 weeks the co-researchers came together with the researcher for a feedback session in which they reported about the interviews and arranged all concepts around a bulls-eye to express their order of

attractiveness. Subsequently they were given some words, abstracted from the contextual user research described in chapter 2, which had been conducted before the competition. The co-researchers pasted the different words on the concepts of their choice and explained their reasoning (*figure 5.12 right*). The opinions and reactions of the co-researchers and participants on the concepts were gathered and combined into an overview that was presented to the FieldLab juries in Delft and Eindhoven (*figure 5.13*).

Figure 5.13 *Materials presented to the jury in Delft*

RESULTS AND DISCUSSION

In this section the main insights from the case study will be discussed. Three important subjects will be addressed: The different roles, the tools that supported these roles and the way opinions are expressed.

Roles

Roles of people turned out to be an important aspect of the co-research method that influences the attitude of the people involved and the results. The role of the co-researcher, the participant and the researcher will be explained in detail below.

Role of the Co-Researcher – Involved and responsible

In all interviews the role of the co-researcher was clearly established at the beginning of the interview when the voice-recorder was turned on and the co-researcher introduces his participant by clearly mentioning who will be interviewed. This start structured the interview and created a frame in which the roles of co-researcher and participant could be played.

Student-co-researcher: *"A very good evening! This is Max, and opposites me sits Teun, tell something about yourself Teun!"*

Elderly-co-researcher: *"We started with the interview with Leo. Today is the 9th and hereby I ask permission to do this interview with you, do you agree?"*

During the interview, the role of co-researcher was played with great dedication; the co-researchers helped their participants and guided them through the process. They encouraged the participants to give their own opinion; they did not interrupt and they listened carefully, accentuating the expert role of the participant. But sometimes situations occurred in which the role of the co-researcher became less clear. For example when the child co-researchers had problems with reading or writing and their participants started to help them. This caused irritation and got them out of their focus.

The co-researchers felt responsible for the outcomes of the interviews. This can be illustrated with the following example: In one of the interviews two participants got involved in a lengthy discussion, stating the same arguments over and over again instead of following or filling in the questions in the booklet. The responsible co-researcher decided to fill in the booklet afterwards, probably feeling uncomfortable with the result and motivated to perform this extra activity.

In the feedback session the co-researchers felt responsible as well, for example some co-researchers apologized for their writing style or for participants that were not that serious. Short answers from participants during the interviews were elongated and sometimes enriched by additions and opinions of the co-researchers in the feedback session in order to seem substantial, probably because of their feeling of responsibility. Especially the students reported at length about the answers from their participants in the feedback session, but in the recordings of the interviews, the answers of the participants were short.

Some co-researchers started thinking on a methodological level: One elderly co-researcher reported that he took the liberty of experimenting with the procedure. He interviewed one participant in the instructed way, i.e. doing the interview and writing answers down in the booklet. His other participant, however, filled in the booklet on forehand and during the interview they discussed the answers. The co-researcher backed up his decision with the argument of being unbiased, but efficiency might also be a motive because the second participant was already present at the interview with the first participant.

Role of the Participant – enthusiastic and curious

Most of the times the participants were placed in the role of expert by the co-researcher. Their motivation to join was their relation with the co-researcher, they were happy to help a friend, and their curiosity about the designs. Some participants were very involved and almost took on the role of co-researcher themselves. For example: most co-researchers skipped the first assignment in the research booklet, which was "paste a picture of yourself and your participant here". One participant, however, didn't agree and wanted to find or make a picture to add to the booklet. In this case the participant took even more initiative than the co-researcher. Another example is one of the elderly participants who was very involved in the research and slightly took over the co-researchers' role when he took the booklet and started writing his answers in the booklet himself. This particular participant was so focused on writing that he did not even hear the follow-up questions of the co-researcher, leaving the latter a bit puzzled and detached. This occurrence was not beneficial for the interview and made the recording slow and one-directed because every word was written down directly and there was not much interaction between the participant and the co-researcher.

As said before, sometimes the children had trouble reading or writing. This took time and was boring for the participants, who did not have much to do while the co-researcher was writing. But not only the children coped with this problem; the elderly and students also took time to write. Sometimes participants used this "break" to talk, leading to interesting additions to their answers. Other participants did not say anything during these pauses; they really needed follow-up questions to keep them going. When the co-researcher focused on writing he could not concentrate on asking follow-up questions.

Sometimes valuable insights were recalled to a participant's memory after the actual research.

> ***Elderly-co-researcher:*** *"After the interview we discussed the booklet and we came to the conclusion that we forgot to mention some things, so we will add that now in a new recording"*

This method, using co-researchers, provided a way to record these extra thoughts because the co-researcher and participant see each other regularly. All co-researchers and participants had an informal gathering right after the interview.

Recording tools

The voice-recorders proved to be props that enhance the professional role of the co-researchers. They helped them to get into this role and to feel important. The recorder gave structure to the interview and on the other hand freedom of content. At the start of the

interview some participants had to get used to the recorder and their co- researchers tried to make the participants feel at ease by explaining what will happen or making a joke about it.

> ***Student-co-researcher:*** *"Strange that this is audio recorded, right? But after a while you don't notice anymore..."*

When the co-researcher and the participant used the voice-recorder, they knew that the researcher is going to listen to their recording later. Especially at the start and end of the interview this was in their head and sometimes the co-researcher asked specific questions to the participant, which he/she already knew the answer to, because he wanted the participant to say it aloud for the researcher.

> ***Elderly-co-researcher:*** *"I heard that you organized a lot of activities for this neighbourhood, can you tell something about that?"*

Sometimes a comment or side note was directly aimed at the researcher:

> ***Student-Co-researcher:*** *"This is the end of the interview, bye! I will see you tomorrow at the feedback-session!"*

> ***Child-Co-researcher:*** *"I don't know how you write this word, you should find out how to write this Fenne (= the researcher)."*

Or they talked about the researcher:

> ***Elderly-participant:*** *"I think this presentation is beautiful, how Fenne made this"*

In case of the children they sometimes played with this "presence" of the researcher. Some comments were directed towards the researcher, and some deliberately hidden:

> ***Child-co-researcher:*** *"Do you know what was really cool, I had a teacher who..... (whispers inaudibly)"*

> ***Child-participant:*** *"Hahaha OK"*

In some cases the children talked about the recorder as towards another person at the table:

> ***Child-participant:*** *"Oh, he made that up! I did not say that recorder! Don't complain with me!"*

Even though they knew that the researcher was eventually going to listen to the recording, when listening back to the audio recordings the informal and relaxed conversations between the co-researchers and the participants did not seem to change their natural behaviour during the interview.

In this case study the voice-recorders were provided to the co-researchers. In case study 1, the co- researchers were asked to use their own recording device. Providing the devices instead of asking the co-researchers to use their own had great advantages, the co-researchers felt proud that the researcher trusted them with this equipment, they did not lose time trying to borrow a device, getting the raw data was easier and the record time was long enough (some phones only record 10 minutes).

Expression of opinions

The feedback sessions of the student and elderly co-researchers gave a rich overview of the opinions stated in the interviews. However, the children co-researchers had a hard time to remember the answers from the interviews and their research booklets have short sentences or keywords that don't always represent the answers from the participants.

> ***Researcher:*** *"Did she explain why she found it nice and boring? Child-co-researcher: "Mmm.... I forgot"*

During the feedback sessions the elderly co-researchers stated that they have the same opinion as their participants. This unanimous opinion was formed during the interviews and discussions but in the feedback session different arguments and opinions were still be separated and explained to the researcher. The students and children did not form this mutual final opinion.

As stated before, short answers from the interviews were sometimes presented elaborately in the feedback session. More arguments were added, sometimes not even mentioned in the interview, often displayed as the opinion of the participants. The co-researchers also gave arguments from the competition's point of view, e.g. does it fit the aim of the competition, and does it fit the stated target group. Most arguments put forward in the interviews were of a practical nature, e.g. it will become dirty. In the feedback sessions the co-researchers had the same kind of arguments, but on top of that they paid more attention to their own context and experience. Striking in the elderly sessions was that they sometimes reasoned from a broad statement to their own experience, maybe to see the reaction of the researcher before sharing it as a personal statement, and sometimes the other way around; from a personal statement to a broader theme, to give it more weight.

Elderly-co-researcher: *"Some elderly, when they see this kind of playground equipment, get a nostalgic feeling and want to use them again".... "I have this tendency too."*

Elderly-co-researcher: *"This was the best one, we really liked it, but a lot of people these days do, right?"*

Free to express yourself

It turns out, especially in the elderly interviews, that the participants were more negative during the interviews than the co-researcher in the feedback session. During the interview they felt at ease with each other, the participants knew that the co-researchers were not part of the project and that they could give their uncanny opinion. We saw for example a difference between the interview of a student co-researcher with his girlfriend or a student-co-researcher with her pupil from dancing class; the closer the participant was related to the co-researcher the more outspoken he/she was.

One of the elderly participants influenced the interview in a negative way. In her opinion the municipality removed too much small playground equipment and only focused on big playgrounds. She related this complaint to the development of the FieldLab and this opinion played a role in her evaluation of the concepts. The location issue became the main topic of a big unstructured discussion in which arguments were repeated and the questions from the booklet abandoned. The co-researcher made up for this interview in the feedback session by extracting useful arguments from the discussion and adding her own opinion.

Opinion of the co-researcher

The students, and in some instances elderly, took the opinion of their first participant as a guideline to ask follow-up questions in the interview with the second participant, measuring if their participants felt the same or differently. They also asked questions that related to their own opinion to measure if their participants felt the same way. Asking this kind of questions was a way to cope with the balance between being an objective researcher and having your own opinion. Some co-researchers struggled with explaining and sharing information on the one hand and being objective on the other.

Student-participant: *"Did you see the concepts?"*

Student-co-researcher: *"Yes, but I can not tell you about that."*

The co-researchers encouraged the participants to give their own opinion. If the co-researcher wanted to share his own opinion he sometimes did this after the participant made a statement, to see if they feel the same way or not.

> ***Student-co-researcher:*** *"OK, I thought this was one of the stronger concepts, but let's move on."*
>
> ***Student-participant:*** *"I think this concept is very complicated."*
>
> ***Student-co-researcher:*** *"Me too!"*

Sharing their own opinion relieved the co-researchers, but sometimes it caused problems:

> ***Student-participant:*** *"I think you are very enthusiastic about this one..."*
>
> ***Student-co-researcher:*** *"No! No no no, you shouldn't say what I think, I know too much, I shouldn't convince you."*

Own opinion vs. opinion of others

The participants talked a lot about other groups in society and found it hard to separate their own opinion from the possible opinion of others. An explanation might be that the concepts did not really suit them personally, but they did not mention that. Some co-researchers specifically asked about the more global use of the concepts, but the participants were not experts on that and the researcher was actually more interested in their own potential use of the concepts.

> ***Student-co-researcher:*** *"Why does it fit you?"*
>
> ***Student-participant:*** *"Because it is multifunctional and interesting for a large audience"*
>
> ***Elderly-participant:*** *"This is really useful for foreign children living in the Netherlands"*

Different target groups

In this case three different user groups acted as co-researchers. The main differences that were found between the user groups concerned motivational aspects and the influence users had on each other. In contrast to the children and students, the elderly co-researchers needed some time to open up. The first encounter was a bit distant. They did not know what to expect and

were short and a bit reserved. But after the interviews, during the feedback session they were talkative and involved. The children were mainly expressing their own opinions, in contrary to the elderly who discussed with their peers until they had the same opinion. The students were intrigued by contrasts: what kind of people liked or disliked a certain concept and why.

It was interesting to see that the same argument can be used in a positive or negative way, depending on the target group. One of the concepts involved blocks of foam. Elderly worry about people throwing with the blocks, this is an argument for them not to choose this concept. Children see this as an opportunity; they like throwing the blocks and see it as a reason to choose the concept but they add the design solution that the blocks should be soft.

Evaluative Research vs. Contextual Research

A second question driving this case study was about the difference between using co-researchers for contextual research purposes and for the evaluation of design concepts. In case of the evaluative research, the co-researchers and participants talked a lot about the opinions of others instead of about their own opinion. This was different from the contextual research, which was specifically about their own experiences. In the evaluative research, the elderly people talked for example about the preferences of foreign youngsters and small children. It was difficult to keep the topic on themselves because the whole world could profit from the concepts according to their opinion. Even though there was an explicit question in the booklet about their own opinion: "Which one would fit you best?" They still talked about the multi-functionality and how it would serve different target groups. In case of the co-researchers, this behaviour might be encouraged by them feeling like researchers and developing a more general opinion about the concepts. Another reason might be that they did not really feel attracted to the concepts. On top of that, the elderly people were thinking about others because they did not see themselves as elderly.

Interfering factor as enrichment

By listening to other opinions co-researchers develop a grounded opinion of their own. If participants don't deliver, the co-researcher makes up for that, turning short answers into rich stories in the feedback session by completing answers with other examples or arguments and corrects negativity. So, we found that the opinion of the co-researcher is an interfering factor that can be seen as enrichment. By using this method, you get uncanny answers from the participants, enriched by the co-researcher and presented in a more dense form. This confirms the insight from case study 1, that by using co-researchers you create "super participants", who bring their own expertise to a depth which they would not have reached as a 'mere' participant. Next to that the original answers are captured on audio.

During the interviews the co-researchers tried to remain objective, but their opinion can play a part in the discussion with the participant or can be stated at the beginning of the process to see if it changed at the end. The co-researchers are not only data gatherers, but interpreters as well.

CONCLUSIONS

This study explored the use of co-researchers in evaluative design research. It investigated the difference between three age groups as co-researchers (e.g. children, students and elderly people) and compared contextual and evaluative research. The main differences that were found between the user groups concerned motivational aspects and the influence users had on each other. To start the interview the participants had to overcome a mental obstacle. Especially the elderly needed encouragement and the feeling that they are valuable experts. The children were mainly expressing their own opinions, in contrast to the elderly who discussed with their peers until they had the same opinion. The students were intrigued by contrasts: what kind of people liked or disliked a certain concept and why. An important difference between the research purposes is that in evaluative research the participants are more explicitly in the role of expert, because they have to judge something. I noticed the development of "super participants", i.e., by hearing other people's opinions the co-researchers developed a grounded opinion of their own. The opinion of the co-researcher can be a valuable enrichment instead of unwanted bias.

LINKS TO OTHER CASES

For more about child and adult co-researchers see: case 6

CASE 5: CAPTURING INTERVIEWS WITH PEERS

Co-Researchers:	28 children (8-9)
Participants:	62 children
Process:	Intro session, booklets, training session, interviews, feedback session
Topic:	Children's own possessions in public space
Location:	Primary school, Delft

The description of this case study is based on the following publication:

Doorn, F. van, Gielen, M., Stappers, P., J., (2014) "Children as co-researchers: more than just a role-play." Proceedings of the conference on Interaction design and children. ACM

INTRODUCTION

In this study 28 children (aged 8/9) acted as co-researchers by interviewing their peers. The main goal of this co-research case study was to enhance the professional role of the children and to experiment with different recording devices to study the methodological consequences. These aspects are related to area 1 and 4 of the framework.

The audio recorders used in the previous cases only captured sound, which already gave a lot of context in the form of conversations, whisperings, interruptions and background noises, but video might give an even richer output since it adds image. Audio recorders are not at hand for every researcher. Therefore, experimenting with mobile phones, which researchers and participants more commonly own, is interesting. Also the combination of audio recording, photography and video, that a mobile phone can make, might give added value. Therefore three different conditions were created, in which the children used different kinds of recording devices: audio recorders (just as in the previous cases), video cameras, and mobile phones to record audio and make pictures.

Some children in the previous studies complained about writing in the research booklets because this slows down the interview. By adding photos and video the emphasis is no longer on writing. However, the co-researchers still need to write down key-words in their research booklets, in order to remember the interviews and being able to reflect on their findings in the feedback session a couple of days after the conduction of the interviews.
The professional role of the co-researchers turned out to be an important factor of the co-research method in the previous cases. The co-researchers take their role very seriously, which makes them feel important and responsible. One contributor to this professional feeling is the audio recorder, a device most of the children never used before, and the fact that they can keep it for a week. It is interesting to investigate if other factors can increase the feeling of professionalism as well. Therefore, more professional tools are introduced: the video cameras, mobile phones, tripods, research bags and research certificates.

USER INSIGHTS NEEDED

The user insights gathered in this study are about how children experience their personal belongings. The insights are meant to be used as a starting point for a design assignment for students about opportunities to combine children's own possessions and public playground equipment.

PROCEDURE

One class from a primary school in Delft participated in this study. This class consisted of 28 children of 8-9 years old. The project started with a kick-off in which the whole class got a presentation about the project and engaged in a discussion about what research is. The main message towards the children was that they are experts and that we need them to gather important data. We wanted them to feel important and responsible. The children asked a lot of questions and seemed interested and eager to start.

After the group discussion their teacher divided the children in 5 groups of 5 or 6 children. Two lead researchers each guided their own groups. The goal of this first meeting was to get familiar with the research subject (borrowing, lending and using personal belongings together) and to think of questions to put in the research booklet. We started with an icebreaker in which they had to guess an object the other child had written down. We wanted them to experience that by asking the right questions you can find out information that you need and we also wanted the children to understand their expertise. They know and understand their peers better than the researcher does. If the researcher would ask the questions she

would need more time to figure out the object. The final step of the first meeting was to think of questions that can be incorporated in the research booklets.

The research booklets consisted of: interview tips and explanations, questions to ask, encouragements and a final question in which the roles were reversed and the interviewer became the participant, in order to reflect on the interview. The booklet ended with a question the co-researchers could fill in after the second interview to compare the two interviews as preparation for the feedback session.

Figure 5.14 *Practicing with the research booklets.*

The second meeting, one week later, was a training session in which the children received interview instructions and practiced with the research booklets by interviewing each other in small groups (***figure 5.14***). During these practice interviews the lead researchers guided the children on what follow-up questions to ask. The tips the children found most important, or personal tips that were given during the rehearsal interview, could be added in a special area in the margin of the research booklet. The inner pages are smaller than the cover of the booklet in order for the tips to be visible during the entire interview. Another important part of the session was filling in a research plan with the children about the choice of their participants and the timing and location of the interviews. It was important (both for security and research insights) that the children chose participants they know very well. The interviews took place at the participant's house since the questions were about personal

belongings and include a tour through private areas such as their bedroom. At the end of this training session, each child received a bag with a recording device (video camera, audio recorder or mobile phone), two research booklets, a pen and in some cases a small tripod (*figure 5.15 left*). After the training the children got one week to perform 1 or 2 interviews.

Figure 5.15 *Co-researchers explore their video cameras (left), the persona template (right)*

After conducting the interviews, the groups of children and lead researchers came together for a final feedback-session. At the start, the children turned in their recording device and research booklets. They reported on their interviews and combined their findings by dividing their participants into different categories and making those into personas by using specially designed templates (*figure 5.15 right*). The templates are filled up with insights and anecdotes from their participants but also from other people they know. At the end of the feedback session all children were rewarded with a co-researchers certificate.

RESULTS AND DISCUSSION

Experimenting with recording devices

Having three different recording devices (audio recorders, video recorders and mobile phones) caused some discussion between the groups. Almost all children wanted to use one of the mobile phones; it took some time to show the possibilities of the video and audio recorders, in order for every child to be satisfied. The children with mobile phones used the audio recording and photography options, since it did not have enough memory to make video recordings of two interviews lasting at least half an hour. It turned out that the audio recordings of the mobile phones were of lesser quality than those of the audio recorders, and that the focus of the children who used the mobile phones was on making photos, which made them forget to tell stories that go with the photos.

Video cameras were used to give the children an increased feeling of professionalism and to get images accompanying the audio. In this case this worked well because they were showing personal belongings to the camera. A side effect of using video camera was that some children appointed a cameraman, an extra person who was sometimes distractive.

> ***Girl:*** *"Our cameraman is using your dolphin as a wrecking ball"*
>
> ***Friend:*** *"Noooo!"*
>
> ***Girl:*** *"He is very annoying"*

When the co-researchers operated the camera themselves or placed it on the tripod it worked well. You can actually see the children, their facial expression, their (sometimes messy) rooms, what's hanging on their walls and how they interact with each other. It also gave the children the opportunity to emphasize certain objects or aspects by zooming in on them.

When using video you don't rely solely on the children's stories. Seeing their room also forces them to be honest, for example in the quote below from a brother with a very messy room:

> ***Boy:*** *"Some children don't take good care of their things, do you have an example of that?"*
>
> ***Brother:*** *"Euh... yes... If you are going to film my room later, you will see that I'm not that careful with my things."*

Some of the video interviews are more formal than the audio recordings because the children are more conscious of being filmed. Because this case was about objects within children's private spaces and within their family homes, video added a lot of context that would be hard to enter and observe as an adult researcher.

A few co-researchers recorded extra material, for example videos of playing a computer game and the way home from school and audio recordings of breakfast in the morning and beat-boxing. These additional recordings raise the level of empathy. They give a glimpse of the children's lives in an unguided way, which makes it new and surprising for the lead researcher. In this respect, the recorders functioned as collectors of more or less random probes into their lives.

Professional role of the co-researcher

Through the emphasis laid upon their expertise in every step of the process, the co-researchers felt that they made an important contribution. Using their input for the research booklets and designing detailed and good looking booklets, templates and forms was appreciated by the children. The recording devices, tripods and research bags also emphasized their professional role. Most of the children appreciated the research certificate they received at the end of the project. An indirect example of the finding that the children felt like experts is that one of the mothers told us that her son came home after the kick-off session telling her that he was an expert and that he therefore needed to do the interviews.

CONCLUSIONS

Three different recording devices were used in this study in order to record the individual interviews the co-researchers conducted with peers. It turned out that mobile phones did not work well; there were other distracting functions and the quality of the audio was not as good as when using audio recorders and switching between making pictures and explaining them on audio was hard. Making a choice between audio recorders and video cameras depends on the research set up and topic, in this case video added a lot of context since we were interested in personal belongings and a tour through the children's rooms.

Co-researchers get to go to places that are less accessible to lead researchers, like the child's room and looking at it through the children's perspective. Giving co researchers control over a recording device that they find interesting, over a period of a week, yielded extra recordings of their daily life situations and play. These slices of life added to the broader empathic understanding of these children beyond the scope of the interviews they held.

Groups of 4-5 worked well in the previous study, this time we used groups of 5-6. In this case it was hard to divide attention between all the group members, to listen to all their stories, to react adequately and to keep them focused.

LINKS TO OTHER CASES

- For more about data gathering in different ways see: case 1+8+11
- For more about motivational tools see: case 10

CASE 6: CO-RESEARCH WITHIN AND OUTSIDE OF FAMILIES

User researcher:	Kim Kaars
Client	Rijksmuseum
Co-Researchers:	5 boys (8-12), 4 adults
Participants:	9 children, 9 parents
Process:	Intro + training sessions, interviews, feedback sessions
Topic:	Family interaction and museum visits
Location:	After-school childcare centre & faculty of Industrial Design

The research in this chapter is described in more detail in the graduation report of Kim Kaars, TU Delft, www.repository.tudelft.nl

INTRODUCTION

Kim Kaars graduated at the TU Delft, Industrial Design, for the Rijksmuseum in Amsterdam. Her assignment was to design a self-guided family tour through the golden age section of the museum. At the time the Rijksmuseum was being renovated, so she was designing a tour for a museum that was not physically there yet. To get insight in family interactions and shared museum experiences, Kim conducted co-research with families. I mentored this project and acted as observer in the co-research feedback sessions. The research focus for the thesis research was finding out if co-research within families can give new insights, even though these families know each other very well.

USER INSIGHTS NEEDED

Kim Kaars wanted to find out what families do together, what they think is important for their shared museum experience and how they envision their ideal museum visit. To get

insight in the experiences of families in museums and to get real-life recordings of their social interactions, Kim decided to use co-research. Five young co-researchers (6-12) interviewed a peer (from another family) and one of their parents. Four adult co-researchers also interviewed a peer (from another family) and one of their children. These two co-research tracks resulted in inspiration and information, combined in 'familias' (*figure 5.16*), and design directions for a product that enriches and enhances the museum experience and social interactions within families.

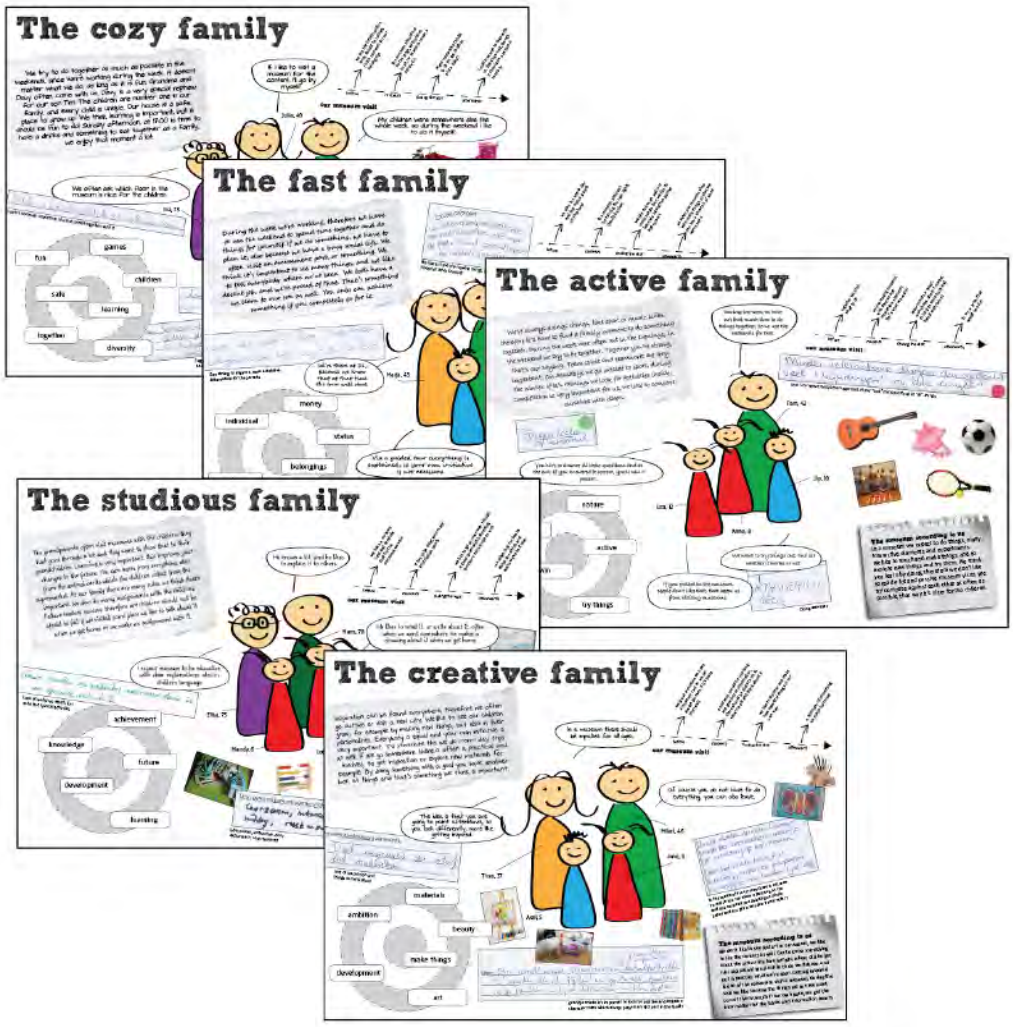


Figure 5.16 *Familias*

PROCEDURE

The co-research phase was split in two tracks; one with children and one with adults. The young co-researchers were recruited via an after school childcare centre in Delft. They were in the age of 8-12 years old and familiar with museum visits, though not specifically with the Rijksmuseum. The adult co-researchers were recruited through Kim's personal network. Each of them had children in the age of 6-12 years old and visits museums with their family occasionally, though again not specifically the Rijksmuseum.

The adult track started with the user researcher personally handing-over the pre-made research materials, introducing the goal of the study and explaining the role of the co-researchers. This was done individually, due to busy schedules of the co-researchers.

The child co-researchers participated together in a more elaborate training session facilitated by the user researcher, which consisted of three parts; a discussion of the pre-made interview booklets, an explanation of interview tips and a practice interview.

The following week, the co-researchers conducted two interviews and filled in the interview booklets. All interviews were recorded with a voice recorder or mobile phone. The interviews took around 30 minutes.

Both co-research tracks ended with a feedback session in which the co-researchers came together to share experiences and results (***figure 5.17***). These feedback sessions consisted of three parts; sharing experiences, creating 'familias' and wrapping-up with a design assignment. The familias were similar to the persona templates in the previous cases, though they now consisted of a complete family. The familia assignment was set-up to summarize the findings of the interviews and is later used as inspiration for the design phase of the project. The final assignment was to design a product to be used in the museum, based on the familias the co-researchers made.

Figure 5.17 *Co-researchers came together in a feedback session*

Design

Guided by the familias and design directions derived from the co-research, Kim Kaars designed a family tour through the Rijksmuseum. In this tour, families answer questions about different paintings they encounter. Each answer helps them choose between different pieces of a puzzle. If the family made the right choices, a pop-up ship can be built at the end of the tour (*figure 5.18 left*). The design can be bought from the website of the Rijksmuseum (*figure 5.18 right)*

Figure 5.18 *Pop-up ship (left), screenshot website of the Rijksmuseum (right)*

REFLECTION

Family interaction

In previous cases, for example case 2 and 3, children were prepared for their role as researcher by thinking of questions to ask their participants that relate to the main topic of investigation. When they realized they did not know the real answers to these questions, they get curious and often motivated to actually go and find out. In the parents' track of the current case study, the user researcher started by asking the parents questions about museum visits from the perspective of their children. All adults gave elaborate answers about what their children wanted and none of the parents said that they did not know the answer. This made me wonder if the adult co-researcher could do without interviewing their children, since the parents knew their children so well.

But during the feedback sessions, the adult co-researchers shared that doing the interviews made an impact on them. They were all surprised by their children's answers. Taking some time, asking questions and listening to their children gave them insights they did not have before.

One of the mothers said: *"If you sit down and interview your own child, it gives you a different perspective on your own family."*

The interviews led to family discussions, which were discussed vividly in the feedback session; Instead of one story, each co-researcher brought three; their own, their peer's and their child's or parent's. While the interviews within families gave multiple perspectives on one family, the interviews with peers showed the differences between families. When discussing the peer interviews in the feedback session, questions like "How is that different from your family?" elicited deeper stories. The two co-research tracks gave insight in the relationships between parents and children and differences between families.

Familias with adults

In this case study the persona template, or in this case the familia template, was (next to the children's session) also used in the feedback session with adult co-researchers. During the adult feedback session the co-researchers started with filling-in a familia template individually. After this, they filled in an extreme familia in couples. It was difficult for the co-researchers to combine participants into a new character; the familias became descriptions of individual participants, to the level that some co-researchers started writing answers from the research booklets on the persona template. This did not happen with the child co-researchers.

After school sessions

Most of the cases in this thesis took place in schools. In the current case, children were recruited from, and sessions took place in, an after-school childcare centre. This had a negative influence on the sessions. The children were tired and excited after a long day at school, making the sessions chaotic and energy consuming. Therefore, during the familia assignment, the group was split in two, which led to more results. Next to that, it was difficult to predict when each child was going to be in the centre, making it hard to make agreements and schedule the sessions. The feedback session was postponed for one week, since only two of the six boys had done the interviews by the original date. After postponing, all co-researchers had done the interview by the time of the feedback session However, for the two boys who had done their interviews before it was hard to remember the interviews in the feedback session.

CONCLUSIONS

In this study we saw that when co-researchers interview family members, this gives insight in the relations and interactions within this family. Co-research with peers outside the

family showed differences and similarities between families. Parents discovered unthought-of insights into their own children when they interviewed them.

An observer helped the user researcher to be more flexible during sessions, for example by splitting up the group during specific parts of a feedback session.

The atmosphere at after-school childcare centres was different from that of schools, which made it more difficult to arrange sessions and make agreements with co-researchers.
When working with an after school childcare centre it is important to have a more flexible set-up.

Adult co-researchers found it hard to combine multiple participants into a persona, especially when they did it together. For adults an individual persona assignment, ending with a group discussion worked better.
The design assignment at the end of the feedback session did not add value in both tracks of this case study, discussing the booklets and personas was more valuable since that led to personal insights from the co-researchers.

LINKS TO OTHER CASES

- For more about child and adult co-researchers see: case 4
- For more about personas see: case 1+2

CASE 7: INTERVIEWS SHOW WHAT CHILDREN ARE LIKE

User researcher:	Johan Langendoen
Client	Ahold, Deelgemeente Rotterdam-Noord, Masters that matter
Co-Researchers:	7 children 9-12
Participants:	14 children 9-12
Process:	Training session, interviews, feedback session
Topic:	Activities after school, food
Location:	Primary school Rotterdam

The research in this chapter is described in more detail in the graduation report of Johan Langendoen, TU Delft, www.repository.tudelft.nl

INTRODUCTION

In the Netherlands, almost one quarter of the children is overweight. Johan Langendoen graduated at the TU Delft, master Integrated Product Design, for the company Masters that Matter, Deelgemeente Rotterdam and Ahold, on designing something to counter overweight in 9-12 year old children. Johan involved children in his project to get their input and adapt his design to their wishes and needs. Overweight is a sensitive topic, therefore Johan decided to use co-research and focus not specifically on being overweight, but on food and eating habits. He expected that children feel more comfortable to discuss these issues with a close friend than with a researcher. They might expect that an adult will start lecturing them. I advised Johan in the set-up of his co-research.

USER INSIGHTS NEEDED

The research focused on the time between school and dinner because this is a period during weekdays in which children are usually unsupervised and make their own food choices. Insights are sought about what children do, whom they interact with and what role food and drinks play. Where are they and what are they doing? Are they alone or together? What do they eat or drink and how do they get it?

PROCEDURE

Together with the teacher of a group 7/8 (i.e., 10-12 year olds) of a primary school in Rotterdam three girls and three boys were chosen to participate in this project. Only one girl was overweight. The children were not told the project was related to overweight but to after school habits. Johan made research booklets (***figure 5.19***) to help the co-researchers to conduct interviews. The booklet consisted of four assignments.

Two sessions with the co-researchers were organized at the school. The first session consisted of an explanation of the project and the research booklet and interview training. After this session the children had 10 days to interview one or two friends. They needed to interview someone within the age group 9-12, who was outside of the group that was doing the interviews. They were asked to do the interview at home in a quiet environment and record the whole session using a voice-recorder.

In the second session, the co-researchers discussed their results and reflected on the similarities and differences of the food habits between their participants and themselves. A second user researcher helped in this session, so the group could be divided. In two groups the different results were combined into personas.

Figure 5.19 Research booklets

Design

Johan used the insights and personas from the research to design "Snaxpert" (*figure 5.20*). Snaxpert consist of a label on healthy food products and an interactive website. Food products that are on promotion in the supermarket are labelled with a scratch-off code. This code provides entrance to an interactive website. The web environment challenges children to execute food missions. The final design consists of 12 food missions. Some of these missions have been tested and evaluated with the target group (children aged 9-12). One mission, for example, is making a moustache from kiwi skin. This mission proved to have a fun-factor and stimulated children to eat kiwis.

Figure 5.20 *Snaxpert*

REFLECTION

The teacher recommended working with 6 specific children from her class because they were open and talkative. Her idea was that they would gather more information than more introverted children. Against expectations, neither co-researchers nor participants in the sessions or the interviews mentioned the topic "overweight". The focus of the research was deliberately taken broader, but Johan assumed that overweight would come up along the process. Maybe the topic is not important to children or not on their mind. But the reason could also be that not enough overweight children were present in the group. Among the co-researchers, only one girl was overweight.

When listening back to the interviews the children did, Johan got to know them. The interviews gave insight in what children are like, how they speak, how they interact with each other, what they do and how they react. But Johan had a hard time analysing or communicating these kinds of insights. He found the recordings of the sessions more suitable for analysis because they sum up the insights from the interviews and give the user researcher a chance to ask follow-up questions. The difference he did notice between the data from the interviews and from the sessions is that sometimes the children exaggerate stories from the interviews in the group session. Johan recommends communicating the results of co-research to designers by showing parts of the recordings to let them hear or see the world of their target group. According to Johan, the user researcher can analyse the feedback session more thoroughly to get design directions.

According to Johan, telling stories does not come naturally to children but is something they need to practice. It is important to teach co-researchers that answers need to be precise, that the interviewer should not be satisfied with an answer like "reading a book", but needs to ask details about an answer. Johan practiced this with the co-researcher by using the first question of the booklet "What would you like to become when you grow up?", and the co-researchers did ask follow-up questions about this in their interview, however, when interviews continued the follow-up questions became less and less.

CONCLUSIONS

By listening to the children's interviews the designer gets an understanding of what children are like. In the feedback session, content is presented more condensed. Since analysing everything is a lot of work, using striking parts of the interviews to get to know the target group and analysing the feedback session for design directions is a way of working when there is little time.

This study shows that the researcher needs to plan which target group the design project is focussed on and how this group is represented in the co-researchers and participants that join the project.

An important aspect of the training session is teaching co-researchers that answers need to be precise, that the interviewer should not be satisfied with an answer like "reading a book", but needs to ask details about an answer. For children it is difficult to keep on asking for details but practicing this in the training session helped.

LINKS TO OTHER CASES

For more about co-research with teenagers see: case 3

CASE 8: IN-THE-MOMENT REFLECTION

User researcher:	Marlies Bouman
Client	Jantje Beton
Co-Researchers:	10 children 7-8
Participants:	10 children 6-9
Process:	Training session, collecting data, feedback session
Topic:	Routes children often walk
Location:	After-school childcare centre

The research in this chapter is described in more detail in the graduation report of Marlies Bouman, TU Delft, www.repository.tudelft.nl

INTRODUCTION

Marlies Bouman conducted co-research with children as part of her graduation project 'Play on Your Way' for National Youth Fund Jantje Beton. The goal of her project was to design play routes that enable children to play (safely) on their way from A to B in the public space.

To get a closer look on routes children often walk and to understand how they experience these routes, Marlies worked with co-researchers. These young co-researchers and their participants walked familiar routes together and discussed what they saw without the interference of an adult researcher. Marlies used three different ways to capture the data the co-researchers gathered; with photos, audio recordings and videos. I acted as a graduation mentor in this project, especially advising in the research phase of the project.

USER INSIGHTS NEEDED

Marlies wanted to find out what kind of routes children often take and how they experience these routes. To give children the opportunity to steer the research Marlies used an open approach. The co-researchers decided which friend to bring, which route to take and what they found important to report on while walking through their neighbourhood. Insights from this research are combined in 'inspiration sheets' that were used in the design phase of the project.

PROCEDURE

Ten children participated in this research, five co-researchers (8-11) and five participants (6-9). The co-researchers were slightly older than the participants because the user researcher expected that the assignments would be rather difficult for the target group (6-9). The co-researchers were recruited from a primary school and a childcare facility. All co-researchers received a research toolbox with assignment cards (***figure 5.21left***). Two of the boxes included a photo camera, two included a sound recorder and one box contained a video camera.

In this case study, the co-researchers did not meet in group-sessions. The user researcher did a training and feedback session with each co-researcher individually because it was not possible for them to meet together.

Figure 5.21 *Co-research toolkit (left), example of an idea card (right)*

Each co-researcher asked a friend or sibling to be a participant. They chose a route the participant often takes and walked this route together. During this walk they executed

assignments from the cards in the research toolbox. The co-researcher asked questions, made notes and recordings. The assignments were about the route in general and about playing on the route.

In a feedback session each co-researcher discussed his/her findings and handed in the research materials and recordings. These materials and the feedback sessions were transcribed, analysed and clustered in 'inspiration sheets'.

Design

In the design phase of the project, the inspiration sheets were used for idea generation (backed up by the general conclusions and findings of the analysis phase). In the end, about 25 ideas were documented (see for example ***figure 5.21 right***). Jantje Beton was very content with the outcomes of the research and the way children were involved in the process, therefore the main goal of this graduation project shifted towards making a tool for Jantje Beton to communicate the process and results of this project as an example of why and how child participation can be of added value. The tool became a fan with 17 sheets, summarizing the process step by step. A general explanation is presented on the front side of each sheet, with a specific example of this project on the back. The tool is meant to inspire and enthuse municipalities to apply child participation.

REFLECTION

Locations trigger memories

In this case study, co-research provided insight in how the target group perceived their direct environment. The children did not sit down and remember experiences; they walked the route and reported on what happened at that moment. When the user researcher listened and looked back at the recordings and notes that the children made, she saw a range of things children encounter and react to while walking through their neighbourhood. Some locations brought back memories; for example one participant remembered on a specific spot that she often chased pigeons there. These personal memories and remarks that were linked to specific locations inspired Marlies during the design phase of her project.

Children's topics

Because of the open approach Marlies used in the co-research assignments, different co-researchers emphasized different topics during their walk. One duo focused for example more on the traffic and roads, and another mainly talked about play opportunities. The different topics that were raised, gave insight in the difference between children and the range of topics that are important to them.

Video is appealing

The assignment cards the children were supposed to fill in during the walk were in most cases filled in afterwards. It was difficult to write on the cards while standing and at the same time carry and operate a recording device.

The research the co-researchers conducted involved more than just an interview; capturing activities and locations were as important. Two co-researchers used an audio recorder and especially one of them described the route elaborately and clearly. However, when listening back to the recordings, the user researcher missed seeing the environment. Audio only gave a limited view on what happened while the co-researcher and the participant walked their route. So, the user researcher walked the route herself after listening to the recordings, to better understand what the children were talking about.

In case of the video recordings this was not necessary; the videos showed the movements and interactions of the children and combined their remarks with the environment. The videos gave the user researcher the feeling of walking with the children and it showed the context the children were talking about, making it the most appealing media. In the training session it could have been explained more clearly when the camera should be turned on or off; in this case there were 24 short video fragments.

An advantage of using pictures (*figure 5.22*) was that the couples had to be selective in their documentation. They could only take a small amount of pictures, which forced a selection process. The limited amount of pictures also made it faster to analyse. When only using pictures it was important to include a feedback session in the process, because it was not always clear which photo belonged to which association/assignment and why.

Figure 5.22 *Pictures with quotes*

CONCLUSIONS

This case study showed that children are able to report on what they see, give their opinion and trigger memories, while doing something familiar like walking through their neighbourhood.

When only pictures were used, a feedback session was necessary to understand what the pictures mean. Only using audio gave a limited view on what happened.

In this study, video recordings gave better insight in the experience of the children that audio or pictures because the images and sound supported each other.

LINKS TO OTHER CASES

For more about different recording devices see: case 5+11

CASE 9: CO-RESEARCHERS WORKING IN DUOS

User researcher:	Remke Klapwijk
Co-Researchers:	22 children (7-11) in duos
Participants:	10 peers (4-7), 4 teachers
Process:	Explore, training, interview, creative session
Topic:	Green school-yard
Location:	Primary School in Den Hoorn

INTRODUCTION

Remke Klapwijk, researcher at 'Wetenschapsknooppunt Zuid-Holland', develops educational programs for Design and Technology education in primary schools. She conducts research, gives trainings and provides tools to support teachers to implement design and research projects in their classes. According to Remke, Design and Technology education is too much object-oriented and needs to be more human centred to experience different aspects of design and engineering:

"When primary school pupils experience that technology is about users and is used to solve important social problems, we expect that a greater portion of them will become motivated for further studies in technology. An increased motivation is very welcome as many Western countries face a shortage of students that choose a career in engineering or in the natural sciences." (Klapwijk & van Doorn 2015)

In this case study, Remke experiments with co-research as an educational method that can be employed in classrooms to include the human aspect in the design process. It is linked to the development of a new 'green' school-yard at a primary school in Den Hoorn. The children from this school designed their own green school-yards, to inspire the landscape architect who made the final design. The children acted as co-researchers and interviewed other children and teachers about their wishes and needs for the new school-yard. The co-researchers used insights from the interviews to inform and inspire their own designs. The

project was organised by Remke, but facilitated by a teacher. I gave advice in the set up of the co-research part of the project. A unique aspect of this case study was that the co-researchers conducted the interviews in pairs; one interviewer and one reporter who wrote everything down.

USER INSIGHTS NEEDED

The goal of this project was to get design ideas for the new 'green' school-yard from the children and present them to the landscape architect who was going to design and make the new school-yard. In the co-research phase of the project the co-researchers conduct interviews with other children and teachers to examine the wishes and needs of future users. They got insight in what users currently do on the school-yard, what they like and dislike and what their wishes for a future school-yard are.

PROCEDURE

The project started with a class-visit to existing 'green' school-yards to get inspiration and set-up an initial list of requirements.

The week after, the teacher dedicated a lesson on preparing the co-research. In duos the children thought of questions to ask in their interviews and added them to pre-made interview booklets. After that, the children practiced the interviews. The teacher facilitated all groups at the same time, giving explanation to all 22 children and walking around to help them. After the rehearsal, the duos received a voice recorder and interviewed a peer or a teacher.

One week later, the interviews were discussed in class and each duo filled in one or more persona templates. With this persona in mind, the children improved the initials list of requirements and wishes.

The week after that, the children made designs for their new green school-yard, using the personas and requirements they developed. Finally they presented their ideas to the company that was going to make the new school-yard.

REFLECTION

Training

The training session was facilitated by the teacher and included all 22 co-researchers at the same time. This led to less prepared, less structured and shorter interviews than in previous cases. None of the children started the interviews with their names and ages or asked permission. Some of the interviews were conducted in a loud environment. As a result, the recordings were difficult to understand and to analyse. Apparently instructions from the training session about the setting of the interview were not remembered.
Some co-researchers did not understand all questions. This resulted in silences when they were figuring out the questions which slowed down the interviews. Overall the amount of follow-up questions was less than in the other cases. The interviews in this case study took on average 15 minutes, in the other case studies the average was 30 minutes.

The teacher could not steer each group by herself. She explained what needed to be done and walked around while the groups were practicing, but she could not help each co-researcher to ask follow-up questions or recognise interesting subjects.

The questions the co-researchers came up with themselves, on the other hand, were presented in an energetic and self-assured way during the interview, probably because they felt more ownership or they understood their own questions better.

Duos

In this study the co-researchers worked together in duos. It was expected that reporting would be easier together, with one main interviewer and one reporter, because taking notes and interviewing at the same time can be difficult. Having two co-researchers and one participant resulted in difficult situations. Some co-researchers stuck together and were more interested in each other than in their participant. They whispered and giggled without telling the participant why, which made some participants uncomfortable and feel overpowered. This was most evident during the drawing assignments, in which some co-researchers became impatient. For example, one of the co-researchers thought it was a good moment to find another pencil and asked his fellow co-researcher to do a commercial break, disturbing the interview.

Even the interaction between siblings was sometimes harsh when the co-researchers conducted the interviews in duos. For example when an older sister brings a fellow co-researcher to interview her younger sister and they conspire against their participant, acting mean to show off.

Special bond between siblings

The co-researchers got the assignment to look for participants younger than themselves (4-7), so most of them chose siblings for their interviews. The interviews conducted at school were done in duos. Some groups decided to split the work and do the interviews separately at home. These interviews are different from the duo interviews; they have a more comfortable and honest atmosphere. The co-researcher and the participant have a lot in common and talk in intimate terms. For example:

> ***Co-researcher:*** *What is the nicest thing that ever happened to you on the school-yard?*
>
> ***Participant:*** *One time I scored six times when we were playing soccer*
>
> ***Co-researcher:*** *Why is that a nice thing?*
>
> ***Participant:*** *I love it when all the others say I did a good job.*
>
> ***Co-researcher:*** *Do you play soccer with big boys or small?*
>
> ***Participant:*** *Big, usually nine or ten year olds.*
>
> ***Co-researcher:*** *Wow, that's great!*

The siblings also discussed differences; because of the age difference they are in different classes and have different friends. Most siblings use the same school-yard, but on a different moment. Some of the co-researchers, but also the participants are truly interested in how their yard is used when they are not there. For example:

> ***Co-researcher:*** *What do you do in the sand pit?*
>
> ***Participant:*** *When I bring a marble I make a marble-coaster in the sand. Otherwise I make a fort. What do you do in the sandpit?*
>
> ***Co-researcher:*** *I usually sit on the edge of the sandpit and discuss small things with friends.*

The booklet ended with reflective questions for the co-researchers to answer by themselves after the interview. In some interviews the participant asked these questions to the co-researcher, turning the roles around, for example:

Participant: *What was striking about the interview?*

Co-researcher: *That you talked about Joep a lot*

Participant: *Yes, I play with him often. That's because I'm in love with him.*

Teachers don't answer from their experience

Some co-researchers got the assignment to interview a teacher. Listening back to these interviews, only one of the four teachers answered the questions from his own point of view. The other teachers all answered from the perspective of the children. For example:

Co-researcher: *What do you like to do in nature?*

Teacher: *Building huts and searching for things.*

The one teacher who did answer the questions from his own perspective gave valuable insights, for example that he would like different remarkable objects, like coloured poles, to meet with his class at the end of the break. Each class can have their own colour so that they can be separated easily.

Drawing assignments

The research booklets included two drawing assignments. In most of the interviews, these drawing assignments took a lot of time. One co-researcher felt the long silences on the recording while drawing were awkward and put on music every time a participant was drawing. When the drawing was finished she said, ok well done! And they continued. This happened in most of the interviews, that the participants were not asked to explain their drawing. Some co-researchers started reporting what the participant was drawing:

"Barend is drawing a tree, a very nice tree!"

Another co-researcher did understand that the explanation is crucial and became impatient with his silent little brother who was focusing on drawing and yelled:

> *"You have to tell what you are making!"*

Other participants had a hard time drawing and they adjusted their ideas to what they could make. One participant for example had some elaborate ideas, but ended up drawing a slide in both assignments because he could not draw what he was thinking about. One co-researcher saw that the assignment was not leading to usable content:

> ***Co-researcher:*** *"Why are you drawing this?"*
>
> ***Participant:*** *"Because it is beautiful"*
>
> ***Co-researcher:*** *"OK, just stop it. We will go on"*

CONCLUSIONS

This study showed that conducting training sessions with smaller groups of co-researchers, leads to a higher level of interview skills than a training session with a big group. In small groups more attention can be paid to follow-up questions and recognizing interesting topics.

Letting co-researchers interview in duos changed the dynamics between the co-researchers and the participants. The co-researchers found it harder to concentrate when they are working together.

The one-on-one interviews with siblings were comfortable and honest, their different but related lives lead to interesting stories.

LINKS TO OTHER CASES

For more about co-research for educational purposes see: case 3

CASE 10: CO-RESEARCH GUIDELINES CAN BE USED BY OTHERS

User researcher:	Britt Luijpers
Co-Researchers:	8 children (8-11)
Participants:	14 children (7-11)
Process:	Kick-off sessions, training sessions, collecting data, feedback sessions, evaluation session
Topic:	Rebellion in Play
Location:	FieldLab and Primary School

The research in this chapter is described in more detail in the graduation report of Britt Luijpers, TU Delft, www.repository.tudelft.nl

INTRODUCTION

This case study describes part of the graduation project of Britt Luijpers, which included a co-research study. Britt's assignment was to design playground equipment that enhances rebellion in play. In literature she found that rebellion in play is beneficial to the development of multiple capabilities like self-reliance, co-operation, problem solving and interpersonal skills (Gielen & van Leeuwen, 2013). But, what is rebellious behaviour according to children? And how do they experience or use it? That was the starting point of Britt's design project. To answer these questions Britt decided to put children in the role of co-researchers and obtain user insights on rebellion in play.

The same procedure was followed in two different settings; in the Profit FieldLab in Delft, and on a primary school in Venlo. Among the results from the co-research were inspiring quotes, personas and structured insights in rebellion in play. With these results Britt designed multiple play concepts that she evaluated again with children.

The second goal of Britt's project was to evaluate a first version of guidelines I defined based on cases 1-6. At the start of her project Britt received these guidelines and she used them to set up, conduct and analyse her research. Insights in how Britt used and experienced these guidelines led to improvements.

USER INSIGHTS NEEDED

The goal of this project was to obtain user insights about rebellion in play and design playground equipment by making use of these insights. The two main research questions were: How do children perceive rebellion and rebellion in play? How do children perceive rules and rules within play?

PROCEDURE

Taking the guidelines as a starting point, Britt started with designing the research process and materials. The materials were used in two studies, one in Delft and one in Venlo, both involving 4 co-researchers and 4 sessions in which the co-researchers and the user researcher (Britt) came together.

During the first session the co-researchers got to know the user researcher and each other. They received general information about the research and engaged in a discussion about rebellion. To add to their feeling of professionalism and give some topical guidance, Britt gave each co-researcher a badge with their name on it and on the back information about the research in case they forgot the details.

In the second session, one week later, the children received research booklets and audio recorders, followed by interview tips and training. After this session, each co-researcher conducted one or two interviews.

These interviews were shared and discussed in the third session, and the insights were combined in a persona exercise. At the end of this session the children received a diploma, stating that they acted as co-researcher, to highlight their expert role.

The data consisted of session transcripts, interview transcripts and research materials, which were analysed and translated into user insights, personas and inspiring quotes. By using these results Britt came up with 3 design concepts. These concepts were evaluated by the co-researchers and by children who did not take part in the previous process.

Changes to the Research booklet

After the use of the research materials in Delft, some changes were made before implementing them in Venlo. In one of the assignments the children had to cut and paste puppets and fill in names and faces in order to describe a day of outdoor play and the social relations and hierarchy between the actors. The question resulted in useful insights, but took very long to finish (around 30 minutes). After this question, most groups stopped the interview, leaving two remaining questions unanswered. Therefore in the second co-research study, the format of this question was changed, the puppets were removed and the questions were more direct. In the original booklet the co-researchers had to think of one interview question themselves. Most of the co-researchers did not use this opportunity and the ones who did, asked: "What do you want in a playground?" Which was hard to answer for the participants. In the second booklet this assignment was removed. Another assignment that was deleted in the second booklet was observing children playing outside and writing down the observations. None of the children had completed this exercise. When asked about this in the feedback session, the children explained that the interview already took too much time so they were not motivated to do this extra exercise. The second version of the research booklet consisted of six questions instead of eight. With the improved booklet, all the children succeeded in finishing the interviews. The interview took approximately half an hour.

Design

Four different types of conflict were distinguished in the research phase: Conflict with inner self, with a peer, group conflict and with the outer world. This, and other insights, led Britt to come up with a vision to design for rebellion in play: "The playground should trigger conflicts by giving children options to experience the dilemma between being rebellious and conform." With this vision in mind, Britt designed multiple concepts. One of these concepts, moving base, is explained in *figure 5.23*, for other concepts and more details see Britt Luijpers' graduation report that can be found on www.repository.tudelft.nl.

Moving base is a variation on the conventional game "hide and seek". Hide and seek evolves around a base, which can be used to tag a person or set yourself free. In moving base there are five bases instead of one, from which only one is active. During the game, children are able to switch which base becomes active. Each base is characterized by a colour. Each hider receives a remote control to activate the bases by pushing the corresponding colour. By moving the base you can sabotage other hiders. But be careful, the remote control makes a beep when pushed, so there is a risk of revealing yourself. The game enables children to use different strategies and explore the consequences.

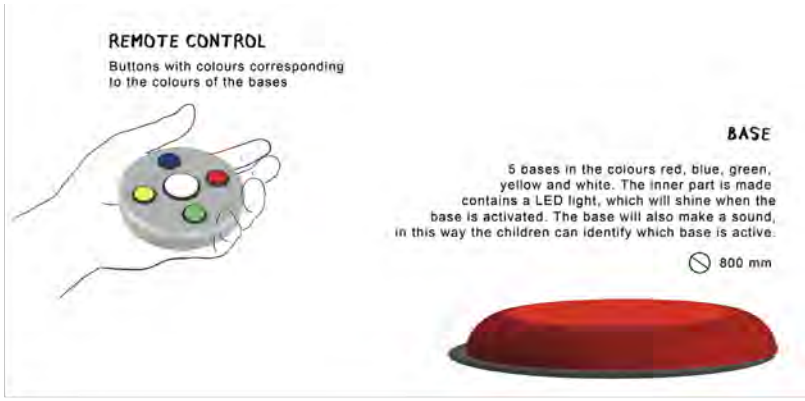


Figure 5.23 *Moving Base*

REFLECTION

2 different locations

In Delft, the recruitment of the co-researchers was done by a woman who works at the FieldLab and personally knows some of the children who visit the FieldLab. It seemed convenient to organize the sessions at the FieldLab, because it is a familiar location for the children that they can visit themselves. Next to that, being in the playground was expected to put the children in the right mood. But during the first session, it turned out that the children found it hard to concentrate in the FieldLab because this is normally a place where they can play and act freely. Finding a new location for the next sessions failed.

The second set of sessions was performed at a primary school in Venlo. Because only four children could join, and a lot of children wanted to participate, selection was done through a lottery. A side effect was that the selected children felt excited and special, which added to their motivation. The co-researchers in Venlo were 10 and 11 years old, a bit older than in Delft, since the experience in Delft was that the older children had a better understanding of the research than the 8 and 9 year olds.

The sessions in Venlo were conducted after school time. The teacher was absent, except for the training session. When one of the co-researchers said: "I don't like the rule that we are not allowed to stand on the table-tennis table. The teacher interfered: "That is definitely not allowed, that is very bad!". After this, the children became quiet and hesitant in sharing their opinion. The user researcher did not dare to ask the teacher to leave.

Motivational tools

To emphasize the children's role, the user researcher consciously used the word 'co-researcher' when talking to them or giving instructions. The children reacted positive to the term and felt more important: "Cool, so I am a researcher?" "Do I also receive a magnifying glass?" Also the name-tags were accepted eagerly by the children and worn to every session, even though they were only intended for the first session and during the conduction of the interviews.

Just as in the other case studies, the voice recorders added to the motivation of the children. During the kick-off session in Delft one of the children took the recorder and recorded a summary of what was said, after that two others followed his example. One of the boys was hard to work with, he was easily distracted and wanted to fight with the other children. This had a negative effect on the session since the other children found it difficult to focus due to the behaviour of this boy. Even though the others tried to calm him down: "Shttt, act normal, we are being recorded", it made the session more energy consuming and after one hour the co-researchers lost their focus. The user researcher tried to overcome this by doing the last assignment in two groups and introducing a competition between the groups. The made the children pay attention but the open atmosphere from before was lost due to remarks like:

"Aaaah we already gave that answer",

or "your answer is really stupid".

Originally the FieldLab research was done with 5 children, but the boy mentioned before quit after the first session, leaving 4 motivated co-researchers. This made the remaining sessions easier.

When the children heard that they could borrow a voice recorder to record their interviews, an excited buzz rose in the group and they showed their increased motivation by acting serious and focused until they received it.

In the training session, the co-researchers received a notebook. This notebook served for writing down important things the children wanted to remember. This made the co-researchers realize it was important to pay attention to what was told. They eagerly compared notes. One girl in Delft was older than the rest of the group. Sometimes she understood things the others did not and she tried to help and guide the other co-researchers.

The co-researchers were motivated by positive encouragements. For example in the training session, co-researchers received compliments from the user researcher on their interviewing skills.

When the group evaluated the session at the end of the training session, of all the tips and tricks they remembered the personal compliments they had received the best. They also gave compliments themselves to participants in the interviews.

Planning

During the training sessions, the co-researchers selected participants for the interview together with the user researcher because it enabled the user researcher to influence the variety of participants. The research booklet started with an exercise to plan the interviews. All children used this exercise and filled it in. However, during the feedback session in Delft one week later, it turned out that only 1 of the 4 co-researchers had conducted both interviews, the rest conducted one interview.

The user researcher decided to postpone the feedback session for one week and use this session to listen to some of the recordings together and learn from it for the second interview. The following week, only one co-researcher did an extra interview. Postponing the session was on hindsight not beneficial, because the co-researchers also forgot some details of their first interview.

"Oh, I don't know why he said that, but you can find it on the recorder".

Sharing results

The co-researchers in Venlo had fun sharing their interview results. They were eager to tell their results and felt proud of what they found. When another child wanted to help a co-researcher to share his results, he said: "No, this is my booklet and my results, I want to share it!"

During the persona exercise in both Delft and Venlo, the co-researchers shared stories effortlessly, even the co-researchers that had only performed one interview. Although some children only had information from one interview, they were able to combine information into personas and integrate their own experiences in these personas as well. These personal stories were not yet shared during the kick-off or training session.

Assignments in the research booklets

Two of the questions in the research booklet received the most diverse answers from the participants. One of these questions was a mind-map on rebellious behaviour. This was one of the first questions in the booklet and it was exactly the same as the mind-map exercise the user researcher did with the co-researchers in the kick-off session. When listening to the recordings from the co-researchers of this assignment it is noticeable that most of them feel confident and are able to guide their participants.

The other question was a simple one: "If you could do one thing, that you normally are not allowed to do, what would you do?" But it elicited a broad range of answers, showing the difference between children and opening up the view of the user researcher. Amongst the answers were stories about eating a lot of candy, robbing a bank, skipping school, stealing toys, stealing flowers from the neighbours' garden or standing on the teacher's desk.

Figure 5.22 Co-researchers with their diploma

Evaluation

Britt evaluated her designed concepts with co-researchers and new respondents. After giving their own opinion about the concepts, both groups received the personas Britt had developed based on outcomes of the co-research. All children in the evaluation were asked to imagine what the personas would think of the concepts and how they would use them. This was easier for the co-researchers than for the new children; they could imagine the actions and feelings of the persona and describe them. For example this reaction of two children about the persona of 'Luc' interacting with one of the designed concepts:

> ***Non-co-researchers:*** *"The popular guy will be very self-confident"*
>
> ***Co-researchers:*** *"Luc would like this concept, because he can show off with how fast he can run. He would move the base in such a way that he can show off and win."*

Experiences of a user researcher

A quote from Britt illustrates that facilitating a group of co-researchers is a skill a user researcher develops over time:

"I believe that it is of great importance for the facilitator to project self-confidence, in order to properly lead the children. During the first session conducted in Delft, it was difficult to get the children's attention. I think I was too gentle, I also felt to some extent insecure because of my lack of experience in both conducting co-research and teaching children. On one hand, I wanted to appear as available as possible to the children by not exerting much power. However I believe a powerful appearance is necessary in order to successfully lead the sessions. Later, I was more confident in leading the sessions, due to my experience with the first session. I succeeded in having a good balance between leading the session and bonding with the co-researchers." ***- Britt Luijpers***

Overall Britt liked working with co-researchers, she developed a bond with them and kept them in mind during her entire project:

"I experienced co-research as a useful method to obtain rich user insights. As a researcher you really create a bond with the co-researchers. During a period of approximately four weeks, you get to know each other well. Trust grows and therefore interesting stories are more easily shared. The method provided me with small, but very interesting details, which other methods might overlook. Analysing the interviews and sessions was really nice to do. It was inspiring to listen to the recordings of the children. I was surprised about their openness and honesty with each other. This resulted in funny quotes and rich information. The opinion of the children and their quotes provided me with great empathy for them, which kept me motivated during the rest project." ***- Britt Luijpers***

CONCLUSIONS

In this study co-research brought user insights that the designer found informing and inspiring.

Starting the interview with an assignment the co-researchers already did with the user researcher gave them confidence. Next to the recorders, tools like name-tags, notebooks and diplomas (***figure 5.25***) were a motivation for the co-researchers to conduct the interviews.

Facilitating co-research is a skill that needs experience, to guide a group of children, capture their attention, know when to interfere and for example ask someone to leave, you need an energetic and confident attitude.

Co-researchers had an advantage when evaluating design concepts. They were better prepared to step in someone else's shoes and looked at a designs from a broader perspective than the new children.

Postponing the feedback session when the majority of co-researchers performed one interview instead of two was not necessary. Only one co-researcher did an extra interview when they received more time and the co-researchers were able to perform in the feedback session with only one interview by combining their findings with own experiences.

LINKS TO OTHER CASES

For more about motivational tools see: case 5

CASE 11: CO-RESEARCHERS INTERVIEWING EACH OTHER

User researcher:	Elena Marengoni
Co-Researchers:	4 children (10-12)
Participants:	the same 4 children
Process:	Introduction, training, interviews, feedback and ideation
Topic:	A new children's library
Location:	International primary school, Delft

The research in this chapter is described in more detail in the graduation report of Elena Marengoni.

INTRODUCTION

The international primary school in Delft recently moved to another building. Elena Marengoni, at the time an exchange student at TU Delft, was interested in the school library of this international school and how the rapidly growing number of pupils and the variety of backgrounds influenced its development. It turned out that the school did not have a clear vision on their library yet and they asked Elena to help them develop it. Elena conducted co-research with pupils to find out what children like and dislike about libraries and how the new library can fit to their way of information seeking and inspire them to read. The co-researchers in this project were each other's participants in interviews scheduled during school hours. Advantage of these scheduled interviews was that the user researcher could prepare the children right before their interview. Disadvantage was that the co-researchers are the only children heard in this research. I advised Elena in setting-up and conducting the research. When writing this thesis, this project was still in the research phase, no design is made yet.

USER INSIGHTS NEEDED

Elena wanted to get insight in children's experiences with books and libraries. What are they doing in a library? What are they looking for? How do children choose a book? And what can facilitate them to find a book in the new library? Insights from this research will be used to design a product or service that can help school libraries to adjust to children's needs.

PROCEDURE

Only four children aged 10-12 were registered in the international school at the time of the research. They became the co-researchers in this project. They participated in three sessions. The goal of the first session was to get the co-researchers in the right mood by showing the relevance of the project and their role in it. Subsequently, the co-researchers thought of interview questions. The first session started with a conversation about what the co-researchers like and dislike about libraries. After that, they were asked to describe and discuss ambiguous pictures related to books, reading and libraries. These discussions triggered interview questions.

Since the co-researchers did not know other English speaking children their own age, they did the interviews on each other. These interviews were scheduled in pairs during school time. Just before conducting their interview, Elena prepared each pair by explaining basic rules and interview tips. After that, Elena gave the children a camera and left the couple alone in the library to do their interview. During the interview, the co-researchers took turns in showing how they search for a book and using the camera, they asked each other questions and discussed their answers.

Before the feedback session, Elena watched the videos from the interviews. She started the feedback session by asking the children to recall interesting things that were discussed in their interviews. After that Elena discussed interesting quotes she distilled from the videos with the co-researchers. In the second part of the session the co-researchers filled in persona templates and designed solutions for problems the personas face in the library.

REFLECTION

The co-researchers were enthusiastic about the project and proud that they were going to be journalists. They were motivated and eager to participate but language differences caused problems. One of the reasons Elena chose the international primary school to do her project was that she does not speak Dutch. English speaking co-researchers made it possible for her to conduct and analyse the research.

During the first session, pictures of situations involving books were used to elicit interview questions. They covered topics like reading before bedtime, storytelling, storing books etc. However, the co-researchers proposed questions about that specific situation instead of the broader topic, for example about the kind of blanket, or the furniture in the room. Elena decided on the spot to use these detailed questions and combine them into broader topics. These topics became the new starting point for a brainstorm about interview questions.

During the interview instructions, right before the interview, the children contributed actively with spontaneous examples from their own experiences. In the interview itself the children used the tips and asked follow-up questions and discussed their answers. Apart from the on/off button on the camera, the co-researchers did not practice using the camera before the interview. The videos the children produced during the interview did not show the things they were talking about, for example the books or closet, making the analysis dependent on their explanation that was sometimes hard to understand.

At the start of the feedback session the children did not recall interesting insights from the interviews. When the user researcher asked more questions about what was discussed, the children gave short answers like: I was looking for an adventure book with a boy as main character. These short answers were used as a starting point to fill in persona templates. In these templates the co-researchers found it easier to build on the characters by adding more details and characteristics.

While filling in the templates, the co-researchers gave valuable examples from their own experiences to check with reality. They also explained the difference and similarities between the characters and themselves. The feedback session ended with the assignment to design a library the personas would use. The ideas were superficial, in terms of their novelty and how far the ideas were developed. But while drawing their ideas the children explained things they would like themselves.

CONCLUSIONS

Pictures of a range of situations related to the research topic can help co-researchers to think of interview questions. If the co-researchers think of too specific questions, the questions can be combined into broader topics.

It turned out to be important to practice the use of the camera, not only the functionalities like buttons and zooming, but also practicing what to film.

In the feedback session it was difficult for some children to start discussing their interviews. The persona template was a useful tool to guide them.

LINKS TO OTHER CASES

For more about persona templates see: case 1, 2, 6

5.4 OVERVIEW OF THE INSIGHTS FROM THE CASE STUDIES

This section gives an overview of the findings from the case studies described in chapter 5. In the case studies we found that children in the role of co-researcher are able do a number of things, but need some help with others:

Children as co-researchers can:

- Accept and act on the role of researcher
- Learn basic interview skills in a short training session
- Listen to participants and ask follow-up questions
- Share and enrich personal user insights
- Combine stories from multiple people
- Interpret stories of others
- Compare stories of others to their own experiences

Children as co-researchers need help with:

- Understanding the focus of the research topic
- Learning interview skills
- Building confidence
- Becoming curious about their participants
- Planning the interviews
- Remembering the interviews

In the remainder of this section the insights that relate to the key aspects of the framework from chapter 3 will be discussed: access, motivation and content. Furthermore I will discuss the interventions (tools, process, location, planning) that were explored in the studies. The relations between these aspects are visualised in ***figure 5.25***.

Further analysis and insights that derived from the connections between the different aspects are postponed to chapter 6. For example the relation between the researcher, co-researcher and the participant.

ACCESS TO PARTICIPANTS

Most of the co-researchers in the cases studies were children. In a few studies, parents, students and elderly people also acted as co-researchers. The case studies explored a variety of configurations in which the co-researchers were trained and in which interviews were conducted. Training the co-researchers in big groups (22 children) was more difficult than in small groups (4-6 children). When co-researchers conducted interviews individually this led to more insights than when the co-researchers worked in duos.

A structure to recruit co-researchers, for example through a school, turned out to be helpful. Organising cases together with a school was easier than with an after-school care centre, which is a less formal structure.

A personal relationship and trust between the co-researcher and the participant provided access to stories and personal environments. The relationship also increased the relevance of the research for the co-researcher, and increased thereby the motivation to conduct the research. Also for safety issues it was important that the co-researcher and the participant knew each other.

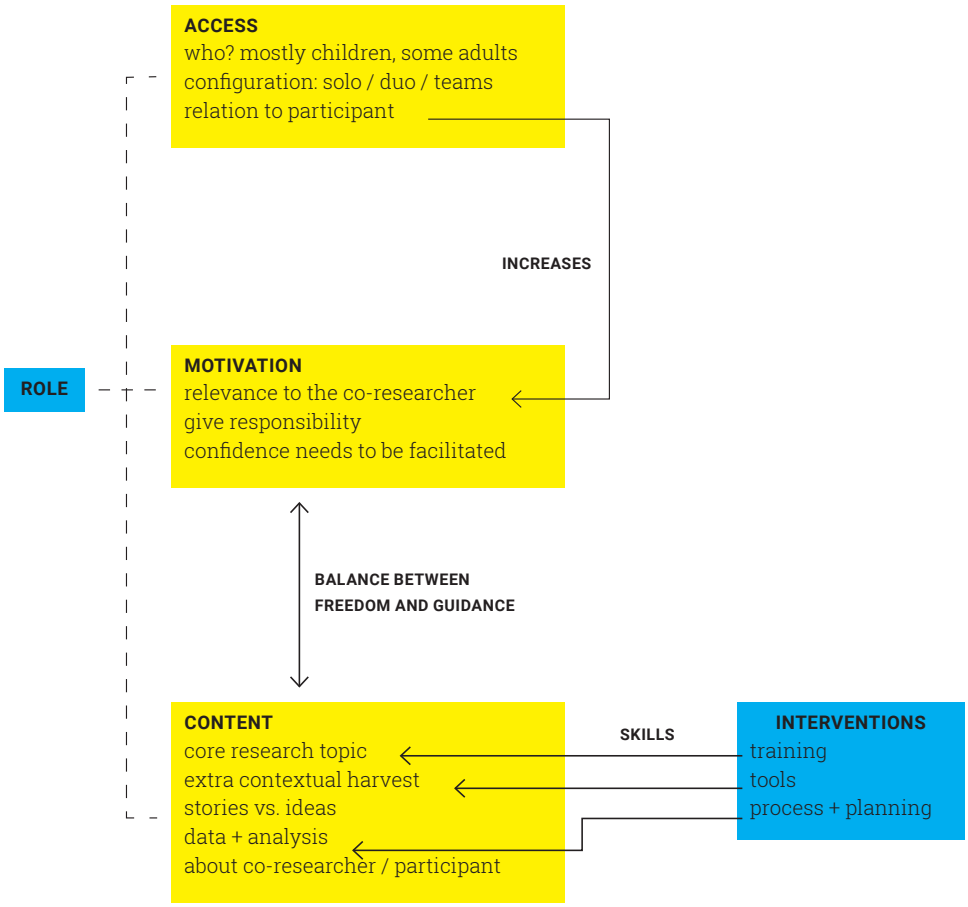


Figure 5.25 *Relations between the key aspects from the framework*

MOTIVATION OF CO-RESEARCHERS TO DO RESEARCH

Next to the relationship with the participants, two other factors that played a role in the motivation of co-researchers were their responsibility and confidence.

Co-researchers took responsibility when they were trusted with the task of doing an interview. They felt that they were taken seriously, especially when they were trusted with recorders and other tools. Some co-researchers for example added observations from their own experience when they were disappointed by the results of the interview. With a responsible role also came status. Most of the co-researchers liked to show off their role and tools to participants and friends.

Confidence; when children were confident that they were able to do the task ahead of them, they were more motivated to start. The confidence of the co-researchers was facilitated by the user researcher with encouragements and compliments. The development of the necessary interview skills also increased the confidence of the co-researchers. By practicing the interviews and putting the interview tips to practice the co-researchers strengthened their confidence that they were able to do the interviews. These increased skills have a big impact on the content of the outcomes as well. The tools the co-researchers used during their interviews helped the co-researchers to maintain the confidence and newly acquired interview skills.

The amount of freedom and ownership co-researchers received in developing their own research focus and interview questions, influenced both the motivation of the co-researchers and the content of the outcomes. On the one hand, freedom and ownership were motivating for the co-researchers and led to surprising new insights. But on the other hand, there was a risk that the insights did not fit to the focus of the project. Freedom also needed to be balanced with guidance: if the topic of the research could be determined by the co-researchers, some of the co-researchers relied too much on their own projections and on cliché images of their participants.

CONTENT

The case studies brought a variety of outcomes. First, user insights within the focus of the research projects. Getting these insights required training because the co-researchers needed to understand the topic of the research. Next to those core insights, there was sometimes extra harvest in the form of insights in the context of the co-researcher through extra recordings of daily activities. When audio-recorders were used, just a few of the children made extra recordings, when video-recorders were used more children made extra recordings which showed their context.

When the end goal for children was to design something, it was harder for them to focus on other people and on collecting stories than when collecting these stories was their main goal. The stories children shared were more valuable for the researcher than their ideas, because the stories were personal, about experiences, expressed values explicitly and gave insight in the context of use.

Both the co-researchers and the participants shared personal stories. When they were both from the intended target group, these stories strengthened each other. Next to that the interviews showed their interactions and social relation. For example in the case 6,

there was a difference in the interviews within and between families. Outcomes include individual and shared memories and opinions. The co-researchers gave both insights 'from' and 'about' their participants.

There were two levels of outcomes in the case studies, the data captured during the interviews and the interpretation of the data captured during the feedback sessions.

Documenting the data from the interviews with recorders and booklets was done by the co-researchers and needed some training.

The background of the interviews also showed context. In video recordings the surrounding of the interview is visible, in the audio recordings other people are sometimes heard.
There was one case (nr. 4) that yielded evaluative content. The other cases all had a contextual research focus.

INTERVENTIONS

When the research skills of co-researchers increased, this influenced the content and outcomes of the interviews. In the training sessions the user researcher helped the co-researchers to use the tools and recorders, to practice with interview skills like asking follow-up questions, to document, plan and ask consent. Next to that the user researcher helped the co-researchers to understand the focus and depth of the research subject and increased their confidence with compliments and encouragements. After practicing in the training session, the tools helped the co-researchers to maintain the interview skills and confidence.

The timing of a co-research project turned out to be important for the two levels of output: data and interpretation. On the one hand, co-researchers needed time to conduct their interviews and possibly make extra recordings. On the other hand, the conversations between the co-researchers and their participants need to be on top of their mind during the feedback sessions.

Other interventions the user researcher could vary were the locations of the sessions and the tools. Most important for the location was that it was not distractive, like a playground or a gym. A successful tool was the persona template, which made it possible to interpret data and make a first step in analysis during the feedback session. The tools were the only influence the user researcher had once the co-researchers left the training session. Role enhancing tools, that children could use to show their role of researcher turned out to be motivating.

ROLE

Many insights from the case studies are related to different aspects of the "role" of co-researcher. Aspects like: the responsibility of the role, status of the role, role-enhancing tools and expectations of the role. In chapter 6 the role of the co-researcher will be analysed more in-depth.

Further analysis and aspects that derived from the connections between the different aspects are described in chapter 6.

CHAPTER 6 - EVOLVED FRAMEWORK

6.0 INTRODUCTION

The initial framework in chapter 4 presented the lenses and expectations with which I entered the case studies of chapter 5. In this chapter I review the findings from the case studies and evolve the framework. At the end of this chapter the research questions that are linked to the framework in chapter 4 will be answered (see ***figure 6.1***).

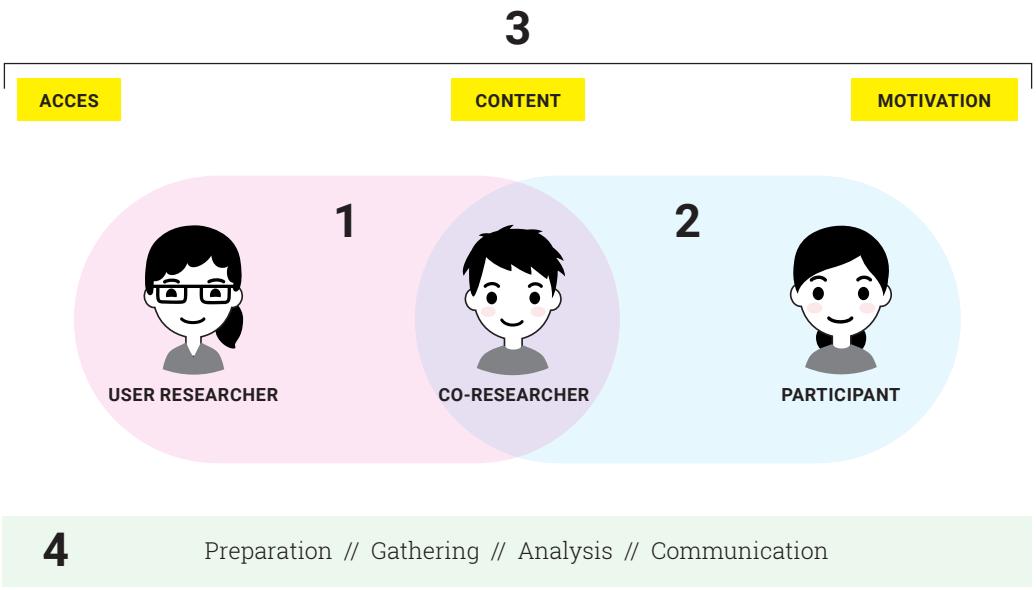


Figure 6.1: Areas of the framework from chapter 4

Area 1 The shared context of researcher and co-researcher
Which research competencies do co-researchers need? How can the co-researchers be trained and how do these competencies influence the contextual research?

Area 2 The shared context of co-researcher and participant
What is the influence of a personal relation between the co-researcher and the participant on the research?

What is the difference between employing a co-researcher from the intended target group and one related to the target group?

Area 3 - The effects of co-research on content, access and motivation
In what way does the co-researcher affect the content of the research results?
What role does motivation play in co-research? What role does access play in co-research?

Area 4 - The research phases and activities within each phase
What role can co-researchers play in the different research phases?

6.1 THE ADDED VALUE OF CO-RESEARCHERS

By including co-researchers in the case studies, many valuable user insights were retrieved. The graduation students that used co-research in their projects (case 6,7,8,11) were confident that the gathered user insights equipped them for concept development. Experience in mentoring graduation students learns that if they don't feel confident with the user insights they will do an additional research activity before proceeding with concept development. This did not happen in any of the graduation projects described in this thesis.

The focus of this chapter is on how co-researchers contribute to contextual user research. The case studies showed that co-researchers have two unique competencies that can enrich a contextual study. Because of their position in-between the researcher and the participant, co-researchers can become amplifiers that (1) enhance gathered data by accessing and sharing their own knowledge and adding context, and (2) help participants to express themselves.

(1) Co-researchers enhance data by adding their own knowledge and context.
Not only did the co-researchers record and transfer data from the interviews they conducted, doing the interviews also made it easier for them to access and share other related memories. In multiple case studies (case 1, 5, 6, 8, 10), the co-researchers shared stories about participants and themselves in the feedback session that were not obtained during the interviews. Even co-researchers who only did one interview shared information about multiple people in the feedback session, including information about themselves (case 10).

As expected, co-researchers added memories of their own that were relevant to the topic. It turned out that co-researchers also enhanced data gathered from participants. Most co-researchers felt responsible for the quality of the interviews they did and when reporting in the feedback session, answers from participants were elongated and enriched by adding context (case 4).

In case 2 it became clear that without preparation, in the form of the interviews conducted by the co-researchers, the co-researchers could not fill in the persona templates. This is an indication that the co-researchers did not form a realistic and rich image of other people without doing interviews.

(2) Co-researchers help participants to express themselves
As expected in chapter 4, participants trusted the co-researchers and shared personal information with them because of their personal bond. Next to that, the factor of accessed knowledge and shared context (discussed in the previous section) also helped co-researchers to facilitate their interviews. Co-researchers asked specific questions, to which they already knew the answers, because they thought it was relevant for the research and they wanted the researcher to hear the answers (case 4). In that way the co-researchers helped their participants to share relevant insights.

Next to that, most co-researchers and participants saw each other in-between the interview and the feedback session leaving time to discuss the interview and the answers. Extra insights from these conversations were shared in the feedback session. In case study 4, a co-researcher and his participant even made an extra recording with things they discussed after the interview.

These two abilities, enhancing the data and helping the participants to express themselves, developed when co-researchers took on the role of researcher. The user researcher can facilitate the adaptation of this role. This is depicted in the evolved framework in ***figure 6.2***. In the next section, each area of this framework will be discussed in order of the corresponding numbers in ***figure 6.2.***

6.2 FRAMEWORK AREA 1: ROLE OF RESEARCHER

Area 1, of the evolved framework in ***figure 6.2***, focuses on the researchers role the users take on. This role turned out to be the main motivation for the children to participate in the studies. When children adopted the role of co-researcher in the case studies, they felt ownership and developed an involved and serious attitude. In the framework in chapter 4 the role of the co-researcher included only activities that fit to the co-researchers' role, but in the cases it turned out that the role of co-researchers comes with responsibilities, status and pride. In this section I will discuss the role of the co-researcher in depth.

A role to be proud of

Most children were proud of the special position they received when they became a co-researcher in the case studies. Especially when they were chosen from a class of peers or by lottery (case 4, 7, 10). They were excited to show off their new role and the accompanying tools in an interview with someone they like.

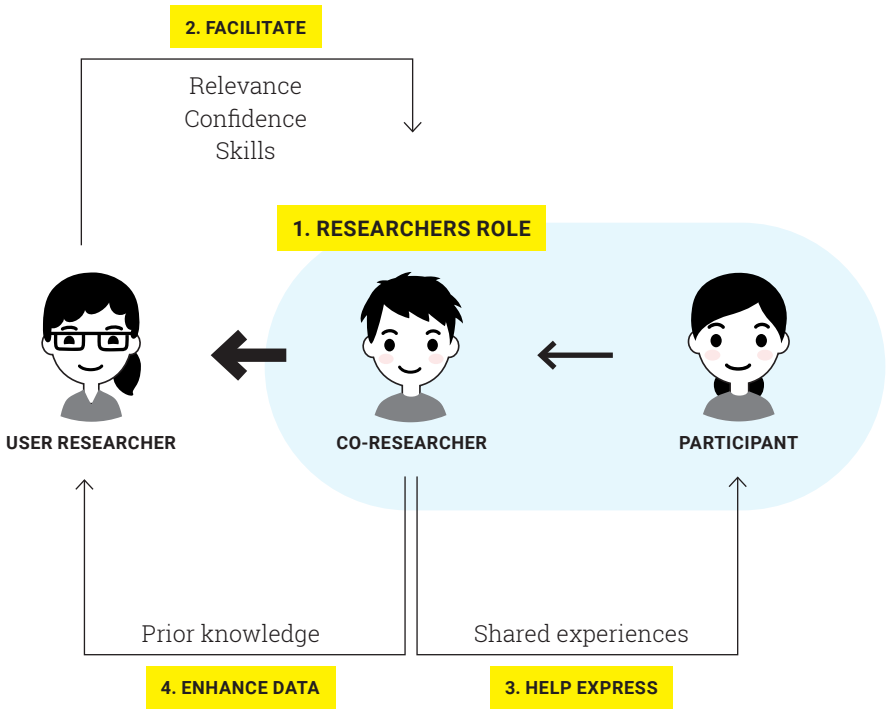


Figure 6.2 *Areas of the evolved framework*

The recording device was something to show off with in particular. In case 5 for example, there was a division in the group of co-researchers; some received an audio recorder, others a video camera and others a mobile phone. When the whole class of co-researchers came together, there was a clear hierarchy; the mobile phones were much cooler than the other devices and the audio recorders were least cool. The children with a mobile phone walked around in class showing their device to anyone and filming everything. They loved the attention they got from other children.

The children with an audio recorder complained to the user researcher that their devices were "less cool" than the mobile phones and video cameras. This shows that status is important. It took a while before the children who received an audio recorder were convinced that their device was important too.

Co-researchers mainly used semi-structured interviews as research method in the case studies. Observations (case 10) and generative techniques (case 1) were also tried, but the co-researchers struggled with these methods. Observations were not in the interest of the children because they did not want to do these by themselves. What they enjoyed most about being a researcher was showing off this role to people close to them, therefore doing observations was less appealing.

Generative techniques were too hard for the co-researchers to facilitate. These assignments took a long time and resulted in long silences, in which the co-researcher wanted to go to the next assignment and did not pay attention to the reasoning behind the answers from participants. In conclusion, semi-structured interviews were easiest to practice and a good way for the co-researchers to show off their special position.

At the end of the case studies, some co-researchers wanted something to take home so that they could remember the project and their special role and achievements in it. For example in case 1, children asked if they could take the persona template home as memorabilia. To satisfy this need and recognise their performance as co-researcher, certificates were introduced, which were appreciated by the co-researchers.

Participants take co-researchers seriously

Most participants, even parents and grandparents, took the co-researchers seriously enough to share their concerns with them. Only in a few cases did a participant need some encouragement. For example when a participant interrupted the interview to ask when they will go and play outside, the co-researcher however did not abandon his role and urged the participant to focus a little bit longer. Co-researchers took their role very seriously in general. However, they did get puzzled when participants tried to take over their role, for example by helping them to read the questions.

In the interviews with teachers in case 9, the teachers did take on the role of participant. Most teachers answered the questions the way children would answer, instead of giving their own personal answers. Probably because the teacher - student roles are dominant and hard to overrule.

A valued contribution

Especially in cases 1, 3, 5 and 10, the user researchers emphasized the importance of the co-researchers throughout the process to make the children understand that their contribution was valued. For example by asking their input in the development of the research materials. Giving this kind of input was new for most children since it differed from what they are used to at school; teachers don't usually ask how a school assignment can be improved. The co-researchers were able to give feedback on which questions could be asked and how the questions would be better understood. The co-researchers realized that their input was used when they saw their ideas and comments incorporated in the final research materials.

Giving the co-researchers professional looking tools like notebooks, name-tags and certificates also showed that their contribution was valued. These tools were much appreciated and elicited professional behaviour, for example in case 10 when the co-researchers wrote things down in the notebooks during the training session.

An influential tool that emphasized the important role of the co-researchers was the recording device. When the co-researchers were told that they could borrow a recording device for a week they often reacted surprised and excited. All children appreciated the fact that they were trusted with this device and this trust was not betrayed: in all studies, the tools were returned in good conditions.

6.3 FRAMEWORK AREA 2: FACILITATION

In the initial framework in chapter 4, the need to prepare the co-researchers for data collection was raised. Throughout the case studies a compact and effective way to train co-researchers for contextual studies was developed. It turned out that the co-researchers were more motivated if they understand the relevance of the project. Co-researchers were facilitated to adopt their new role by showing them relevance (2.1), developing their interview skills (2.2) and increasing their confidence (2.3).

FACILITATION: SHOWING RELEVANCE

At the start of the case studies, the children were excited about their new role of co-researcher. However, understanding the relevance of the project kept them motivated over time. Relevance was shown by linking the research to the lives of the co-researchers, explaining

why they are valued experts and what would happen with the results. A surprising new insight was that not only the insights or design outcomes from a co-research project are seen as relevant, but also just understanding participants was relevant to the co-researchers.

The start is important

The kick-off session was in most case studies the first time the user researcher saw the co-researchers. In this session the relevance of the project was stressed from two sides. On the one hand the relevance of the co-researchers to the project and on the other hand the relevance of the project to the co-researchers. The researcher explained that the co-researchers were relevant to the project because they are important experts that would be taken seriously. The topic of the project was relevant to the co-researchers because it linked to their daily lives. The children were introduced to the goal of the project and their role in it and learned what being a researcher entitles. In order to show them what they could expect, the co-researchers were shown the structure of the project and their role in each step.

Interest in participants

When I set up the first case I expected that the co-researchers would be most motivated for taking part in ideation. However, in cases 1, 3, and 6 it became clear that this is not the only aspect that makes a co-research project relevant for the co-researchers.

Satisfying a curiosity about others was motivating in itself. In the kick-off and training session of case 1, 3 and 6, the co-researchers thought of possible answers from participants and when they could not imagine these, they got curious and saw the relevance of doing the interviews. Especially in case 3 the children felt engaged with the elderly people and wanted to understand them. Doing the interview strengthens the bond between the co-researcher and the participant. Parents in case 6 said doing the interview with their children had an impact on them, listening to their children gave them insights they did not have before.

Relation to co-researchers own experiences shows relevance

Not only the relevance for the project as a whole was motivating but also the relevance of each step the co-researchers took. For example the training sessions, in which the co-researchers received tips and tricks for their interview. In case 1 and 11 the co-researchers linked the tips they received to their own daily lives. For example: the tip to leave silences in an interview to make the participant think of more to say. The children could link this tip to their own lives because they remembered moments when they were asked a question and needed some time to know what to answer. These examples from conversations in their daily lives showed why the interview tips were relevant. Later, in the interviews, the co-researchers used these tips eagerly; they asked a lot of follow up questions and experimented with pauses and an occasional mysterious hmmmm… to evoke more stories.

Relevance shown in the interaction with user researcher

The role of the user researcher changed when the co-researcher was added to the research team. The user researcher became a facilitator, helping co-researchers to gather, share and enrich data. In the studies we saw that the way the user researcher approached the co-researchers showed how relevant they were. Being open, approachable, encouraging and trusting were vital characteristics for the user researcher to guide the co-researchers.

Freedom

In case study 3 the co-researchers had a lot of freedom, they chose their own research focus and designed their own interview booklets. This freedom was motivating for the co-researchers. But it was hard for the co-researchers not to start from prejudice or project their own experiences on their participants. They needed guidance from the researcher to develop a more open view.

FACILITATION: DEVELOPING INTERVIEW SKILLS

The training sessions focused on the development of interview skills. Important parts of the training sessions turned out to be: Making the co-researchers feel comfortable with the interview questions, sharing tips and tricks and practicing the interview.

Feeling ownership of the interview questions

In case 9, the co-researchers did not feel comfortable with the interview questions because they had a hard time reading them and felt insecure about what to do with them. This negatively influenced the interviews. Therefore explaining each question in the research booklet and getting familiar with them became an important part of the training session. Also discussing why each question is in the booklet and if applicable how they are related to the input the co-researchers gave in the first session helps them to understand why these questions are in the booklet.

When the co-researchers felt comfortable with the questions the interview became their own, instead of an assignment they needed to do. Other ways of helping the co-researchers to make the interview their own were: co-creating the questions, including empty spaces in the booklet to let the co-researchers fill in their own questions and dedicating space in the booklet to make notes in the training session that can be used in the actual interview.

Tips and tricks

After the co-researchers had familiarized themselves with the interview questions, the user researcher shared interview tips and tricks. These tips had the most impact if the children

related them to their own experiences (see also 2.1 relevance for further discussion). Sometimes this occurred naturally, and in some cases the user researcher stimulated this by asking questions. Overall the children were capable of doing the interviews. The topics most co-researchers needed to be trained in were: when, how and why they should:

- Ask follow-up questions
- Use pauses
- Ask participants to think aloud
- Ask for details and more precise answers (and not be satisfied too soon)
- Start and end the interview
- Record the interview
- Focus on stories instead of questions

The last item on this list needs more explanation. In case 1, some of the participants told interesting and personal stories that drifted a bit away from the actual question but gave relevant insights. The co-researchers cut them off and asked what their exact answer was to the question, losing important stories. In the next case studies the training sessions stressed the importance of focussing on stories instead of working through a list of questions. The user researchers explained that the goal of these questions is to understand people and their experiences.

This relates to the goal of the project as communicated to the co-researchers. In case study 1, the goal of the project was to think of ideas for a movement garden. This design-oriented goal made them constantly think of ideas and distracted them from the stories of their participants. In other case studies the main goal for the co-researchers was to collect stories, this made the co-researchers more open to their participants.

Practicing the interview

An important part of the training was that the co-researchers practiced the interviews on each other. During this practicing the researcher could see how much they understood from the explanation before. This also was the moment the researcher helped the co-researchers understand what kind of follow-up questions were relevant. When they practiced the interview, the co-researchers learned from each other and received positive encouragements

from both the researcher and the other children, which increased their confidence. Some co-researchers experienced difficulties with starting the interview and asking permission. Therefore this topic was switched from the tips and tricks part of the training session to the practice interview. This solved some problems, but asking permission was still hard for some co-researchers.

Working in groups

Throughout the case studies, the level of skills of the co-researchers varied. The main difference in skills was linked to age. Mixing ages in a group of co-researchers turned out to be beneficial because the co-researchers helped and learned from each other (case 1, 6, 8, 10). For example when they practiced the interviews in the training session, or when they built on each other's ideas in brainstorms about interview questions.

Working with small groups of co-researchers, around 4 or 5, created a comfortable atmosphere in which the researcher could give attention to all of them. When working with bigger groups (case 5, 9), it was hard to divide attention and create an open atmosphere in which the co-researchers could focus. Also coaching the use of follow-up questions and recognizing interesting topics was harder in a big group. Training a big group of 22 co-researchers at once in case 9 led to shorter interviews with less quality than the children who were trained in small groups.

Preserving skills

The timing of the co-research projects needed to be balanced: when the interviews were too far away from the training session the developed skills of the co-researchers were lost. When the feedback session was too far away from the interviews, details of personal stories were lost. The research booklet made the link between the training session and the interviews. The tips and tricks from the training were repeated in the research booklets and the personal lessons were written down either in the research booklet or an accompanying notebook.

FACILITATION: GROW CONFIDENCE

The research kit facilitated the co-researchers when they conducted their interviews. This kit contained the booklets, a recording device, a charger, a tripod and stationary such as pens and paper. These tools showed the co-researchers that they were taken seriously and emphasized their role of researcher, which gave the co-researchers more confidence. The confidence of the co-researchers was strengthened even more when the research materials incorporated input they gave.

Even when they saw the relevance of the project and increased their interview skills, some co-researchers found it scary to organise and conduct the interviews. They needed to build confidence in their researcher role. One way to facilitate that was by giving positive encouragements and mentioning their expertise throughout the project. Especially during the training session, positive encouragements increased the confidence of the co-researchers and motivated them. For example when co-researchers asked follow-up questions the user researcher had not thought of, they would be praised and told that that is one of the reasons why they are so important for the project. Once they took the step and conducted the interviews the co-researchers felt proud and wanted to present what they found.

Co-researchers felt more confident if they understood the process and what was expected from them every step of the way. In the studies we found that well-structured materials facilitated this need. For example, in the kick-off session the co-researchers received assignments and materials to help them think of interview questions, like mind-maps in case 1 or pictures in case 11. The same applied for sharing their results in the feedback session. Just discussing the interviews was hard for most co-researchers. The persona template turned out to be a useful tool to guide them in smaller steps.

The co-researchers also needed help to organising their interviews. By discussing whom they were going to recruit, when and where they were going to conduct the interviews and documenting these decisions, it was easier for them to execute it.

6.4 FRAMEWORK AREA 3: HELP PARTICIPANTS TO EXPRESS THEMSELVES

When the co-researchers saw the relevance of the project, developed interview skills and felt confident, they took on the role of researcher and helped participants in their interviews to express themselves. This happened on two levels. As expected in the initial framework in chapter 4, the co-researchers gathered personal stories because their participants trusted them and spoke the same language. Next to that, the co-researchers helped their participants to express themselves as well by deliberately steering the interview towards shared memories that they considered relevant. The shared context and their more developed idea of what is important for the research caused that co-researchers knew what to ask; making them ask questions they already know the answer to.

Level 1 – Personal bond

The co-researchers had a positive influence on their participants. The participants trusted them and shared personal information. In general, the interviews had a relaxed atmosphere

and consisted of personal conversations. The co-researchers guided their participant through the interview, most of the time patiently and involved but if things went too slow they sometimes lost their temper. Participants felt free to say what they want; in case 4 for example, participants in the interviews expressed more negative comments on design ideas than the co-researchers gave in the feedback session because they were amongst friends.

Especially the interviews with siblings were personal and open, except for the ones conducted in teams. When two co-researchers interview together it was harder for them to concentrate and they were less sensitive toward their participants (case 9).

Co-researchers had the opportunity to go to personal environments, for example: the participant's bedroom in case 5. Doing the interviews in these locations brought back memories, like in case 8, when a walk through the neighbourhood of the participant brought up personal stories. Looking at these locations through the eyes of the children gave relevant data relates to the topic to the researcher.

Level 2 - Considering shared memories from the research perspective

Co-researchers are connected to the researcher, but also to their participants. Both connections can be retraced in the interviews. The role of researcher is played convincingly and questions are asked loud and clear. But in a soft voice, co-researchers give other comments and instructions to the participants about what they could answer. Or they ask follow-up questions about specific things that happened, to which they already know the answer. The process of becoming a co-researcher increased their knowledge of what are relevant answers and they help participants to express these.

COLLECTING DATA DURING THE INTERVIEWS

Different recording devices and research booklets were used in the case studies to gather data from the interviews. These devices helped to set the stage, turning them on and introducing the people present marked a clear start of the interview and created a frame in which the roles could be played. The main purpose of the booklets was to help the co-researchers, but also to fill in answers. In each case the choice for a device depended on the focus and budget of the research.

Recording video

Seeing the videos children made, increased the empathy of the researcher because the videos showed the children, their interactions and their environment. When the location was an important part of the research subject (like case 5 and 8), using video was beneficial because the

co-researchers showed the surroundings and reported on what they were seeing and what was happening at that moment. The interviews on camera were sometimes a bit more formal than the ones in which only audio was recorded, because the children were more conscious of being filmed.

Recording audio

The audio recorders were, more than the other devices, a link to the researcher. In the interviews with the audio recorders, comments were directly made to the researcher or deliberately hidden from the researcher. More than with video, the children decide what to share, they are in their secure environment with a connection to the researcher via the recorder.

Taking pictures

When the co-researchers took pictures, especially analogue ones like in case 8, an advantage was that children needed to be selective in their documentation because they had a limited amount of pictures. This made them conscious of what to involve and what to leave out and led to more depth in the discussion afterwards. The pictures by themselves did not give a lot of info, but they were fuel for the feedback session.

Research booklets

Next to making recordings, the co-researchers filled in their research booklets during the interviews. Up to five assignments in the booklet worked, more than five was too much. Each assignment consisted of a couple of questions, a topic to discuss or something to do. Starting the research booklet with short and easy questions gave participants and co-researchers time to get used to the setting. In some cases the do-assignments took too long. In case 9 for example, a drawing assignment took very long and the co-researchers got bored with the assignment. Next to that, some participants changed their answer to the question because they could not draw it. When do-assignments were included in the booklets it was important that the participants explained what they were doing or making. Other do-assignments that worked were for example: showing objects (case 5) or walking a route while giving opinions (case 8).

EXTERNAL INFLUENCES

Sometimes external factors influenced the interviews. For example people that were present in the room when the interview was conducted, or parents that wanted the children to go to sleep or go home. Sometimes these influences were positive, like giving good suggestions, and sometimes they were negative, like time pressure or a noisy environment. It was helpful to discuss these factors in the training session because the co-researchers could adapt their location or time of the interview accordingly.

6.5 FRAMEWORK AREA 4: ENHANCE DATA

In the initial framework in chapter 4, co-researchers were expected to develop a broader view on the research topic and get more insight in themselves by listening to others. This would mean that they add more to the research than only collecting and transferring stories from participants. This expectation was confirmed in the case studies; the co-researchers added their own knowledge to the research and enriched data from their participants. In *figure 6.3*, this is depicted by the bigger arrow from the co-researcher towards the researcher, compared to the arrow from the participant to the co-researcher.

CO-RESEARCHERS ADD THEIR OWN KNOWLEDGE

In the training and feedback session, the co-researchers were useful sources themselves when they talked about their own experiences and shared and compared these with others. When befriended co-researchers came together in these sessions, they also added context to each other's answers. Open assignments and questions led to a variety of interpretations by the co-researchers and evoked different kinds of insights. For example in case 10, in which the variety of interpretations of co-researchers led to a multiple perspectives on what was important about the public space to different kinds of children.

Another example of the co-researchers being useful sources themselves can be found in case 5, in which some co-researchers used a video camera for one week. Next to recording the interviews, several co-researchers recorded things they did themselves during that week, like going home from school or playing video-games. These recordings showed their daily life and increased the empathic understanding of the researcher.

CO-RESEARCHERS ENHANCE DATA FROM PARTICIPANTS

Co-researchers shared meaningful and personal insights from and about their participants. If participants did not deliver, the co-researcher made up for that and turned short answers into rich stories in the feedback session by completing answers with extra information and other examples or arguments.

In case 1 and 11, the co-researchers found it difficult to talk about what happened in the interviews without guidance of the researcher. Topics and materials to structure this

discussion helped the co-researchers to express themselves. Persona templates worked very well to collect and combine personal insights and to compare participants and co-researchers. By filling in these templates together the co-researchers felt more comfortable to share personal information and build on each other's input.

The interviews and feedback sessions from the case studies were recorded and transcribe, both gave a different kind of data. The interviews included uncanny answers from participants and created an understanding of what children are like and what they are talking about, which gave insight in their world. In the feedback sessions the content was filtered and enriched by the co-researchers, who thereby actually did the first step of the analysis. So, in the feedback session the content was presented more condensed and more directed towards the research topic.

CO-RESEARCHERS FROM THE TARGET GROUP

Throughout the case studies we worked with both types of co-researchers. When co-researchers from the intended target group gave examples from their own experience, compared themselves with participants and discussed differences and similarities, this was all relevant data. The answers they gave while practicing the interviews were also relevant for the research. When working with key-persons (case 1, 3, 6, 9), the experiences of the co-researchers themselves were not as relevant, except if the topic of research was their relationship.

6.6 ETHICAL CONSIDERATIONS

In this section I reflect on ethical considerations from the case studies along three dimensions discussed in chapter 4: procedural ethics, situational ethics and relational ethics. At the end of this section I describe my own ethical positioning.

PROCEDURAL ETHICS

Procedural ethics involves the process of seeking formal approval for human subjects research from an ethical committee. A prominent dimension of procedural ethics is informed consent. This means that prospective participants (and in the case of children

their parents or caretakers) are informed of the content of the research, their rights to their data and quitting, and give their consent of their participation in writing. In all case studies in this thesis the parents of the co-researchers gave written consent for their children to join and to use recordings and pictures for scientific purposes. In case studies related to schools the consent forms for co-researchers were easily arranged. The children were asked if they wanted to join themselves in the kick-off session of each case study after the researcher explained the project and their role in it. All children wanted to join. In school projects it is harder for children not to participate or to quit. They feel more obliged to participate, possibly influencing their consent. Monitoring the children's motivation and behaviour during the process helped to see if they still wanted to continue. Over the weeks, when children seemed less interested or distracted they were given the choice to quit the project, almost none of them wanted to quit and it motivated them to step up. Only in case 8 and 10 a child quit because of disinterest.

More specific to co-research is the second layer of consent; that of the participants and their parents. Getting informed consent from participants was more difficult. In most cases it was a burden for the co-researchers to ask this from their participants. In case 1 the co-researchers got the assignment to get the written consent of the participants' parents signed by an autograph. This failed, almost none of the co-researchers managed to do so. The data was still used, the reason for that will be explained at the end of this section. In case 5 we introduced vocal consent, stating on the recording that the participants want to take part in the research and have approval of their parents. More co-researchers succeeded to do it this way, but it was hard for the co-researcher to explain what the participants are giving consent for, even though it is written in the research booklet, as this is often not read. Next to that, there is no supervision on the information that is transferred and there is no direct contact between the researcher and the parents of participants, so this way of getting consent is of less value compared to the forms signed by the parents of the co-researchers.

Another aspect of procedural ethics is protection from harm (either physical or psychological). In the case studies children did interviews with participants without supervision. The researchers urged the children to recruit participants they personally knew and made agreements with the children before the interview about who they were going to ask and where they were planning to conduct the interview. In one case study the children did an interview with elderly they did not know. They did not listen to the instructions from the researcher about not asking unfamiliar people. However, the warning of the researcher did make the co-researchers discuss their plans with their parents. One of the parents worked in the elderly home from which the participants were recruited. By discussing the subject of safety with the user researcher, the children became aware of the risks.

The majority of studies were conducted at schools. When doing the sessions at a school there is a context of care present. If something goes wrong we can benefit from the structure of responsibilities the school has.

A last aspect of procedural ethics is privacy. The stories shared in the interviews were often personal. In the training sessions the researchers explained to the co-researchers that other people would listen to and use the information that was shared in their interviews and that we therefore needed permission of the participant and his or her parents. The researchers also showed the erase button on the recording device the co-researchers received, telling the children that if they did not want to share an interview or if they wanted to start over again, they could erase files. Only one girl mentioned that she erased an interview but she stated it was an accident.

SITUATIONAL ETHICS

Situational ethics consider moments of ethical importance in the field and advise that ethical decisions should be taken on a case by case basis. One unexpected situation that occurred was that, next to the interviews, some co-researchers made extra, personal, recordings. Some co-researchers were aware that these recordings were on the device, because these co-researchers showed them to other group members before handing them in. However, I do not know if all co-researchers were aware these recordings were still on the device.

Another unexpected situation occurred when the researcher discussed with a group of co-researchers who they were going to ask as participants. The children were very enthusiastic and some co-researchers thought of three people to ask. One of the co-researchers panicked a bit and told the researcher that she did not have anyone to ask that fitted in the age range we were looking for. The researcher quickly decided that the age range did not matter that much and that she could ask her sister. It was noted by her expression that it was a relief for the co-researcher that she could still participate. In order to protect the co-researcher from harm the researcher changed the age range to include all co-researchers and make them all feel relevant .

RELATIONAL ETHICS

Relational ethics value the interpersonal bonds between researchers and the people they study. Researchers should be responsive to the needs of others and take care of the relationship with others. This aspect turned out to be most valuable within co-research, which largely depends on the different kind of relationships of the actors involved. When

we look at the relation between researcher and co-researcher, the co-researcher takes on responsibility and puts a lot of energy in the project. In a relationship attentive to the needs of the co-researcher, he/she would receive something back as well. One of the advantages for the co-researcher is personal growth; by taking part in the research the co-researchers learn something. An indicator for personal growth of the co-researchers was that after conducting case 1 with a primary school in Delft, 2 other schools became interested in using this process with their own pupils as well and contacted me to cooperate, because they saw educational benefits for the children. Next to that, the head of the school in case 5 told me, almost 2 years after the case study, that the children still benefited from the experience. According to him they became a special group who are very loyal to each other, curious and open for new approaches.

Another aspect of the relationship between the researcher and the co-researcher is reciprocity of information. When the co-researcher gives insights and puts effort in a design related project, the user researcher should communicate what will be done with this input. Only in case 1 and 10 the co-researchers got the opportunity to see and react to the designs that were made using their input. In the other cases there was no feedback about the results of the study, sometimes because the designers wanted new children to look at the results or because results were used much later and it was difficult for the designer to contact the children again. Even though this feedback was not promised, not giving any is ethically incorrect. The children felt ownership and were involved; they deserved to hear what happened. My recommendation for future co-research projects is to pay attention to giving feedback to the co-researchers about what came out of the research and what happened to the results.

In co-research there is also a relationship between the co-researcher and the participant, and this is a special one because it already existed. The research can influence this existing relationship in a positive, but possibly also in a negative way. Some children lacked basic knowledge about their participants before the interviews. For example the name of a grandfather or what kind of job the child's father has. Many of the co-researchers learned something new about their participants, bringing them closer to their friends or family. A co-researcher from case 1 said for example: "My grandfather told me that he used to play soccer a lot, and all kind of things he did when he was a child, building huts for example! Usually he doesn't share these kind of things."

In the relationship with their participant, co-researchers are both peer and researcher. A close relationship between the co-researchers and the participants results in more outspoken opinions and more freedom for the participants to express themselves. But the double role can also lead to uncomfortable situations. The role of researcher makes the co-researcher

feel responsible for the answers of the participants and the quality of the outcomes on the one hand, and on the other they feel loyal to the participants. Sharing insights in a more anonymous way like the persona templates helps to balance their responsibilities. The co-researcher also makes ethical decisions, for example do I stay close to the answer the participant gave or do I use the situation for what I think is important? By having the design as end goal, it is hard for some children to separate what they want themselves from what the participants want. One co-researcher for example reported that his participants really wanted a swimming pool, but maybe this was his own opinion, because the last couple of sessions he mentioned that he wanted a swimming pool over and over again and his participant did not mention it in the interview. Not all children thought this way; one co-researcher reported for example that his friend wanted a quiet place to read, while he hated reading himself.

Another example of a relational ethical consequences was observed when the co-researchers and participants switched roles at the end of their interview in case 5. The last assignment in the research booklet in case 5 was to switch roles, giving the participant the opportunity to ask the co-researcher some reflecting questions. A couple of co-researchers and their participants skipped some of the other questions, but all children filled in this particular assignment since they liked switching roles for a minute. This assignment was included to let the co-researcher and the participant take some distance and reflect on the interview together, in order to prepare the co-researcher for the feedback session. An unforeseen and unwanted side effect with ethical implications was that switching roles gave the co-researcher the opportunity to evaluate the participant instead of his own performance.

> ***Co-researcher:*** *"You did not understand some of the things, that is a big difference with the previous interview I did, that person did understand"*

This personal evaluation can be hurtful. After this study the role-switch was no longer used.

ETHICAL POSITIONING

As reflected by the experiences in the case studies, co-research by its very nature brings about a number of issues to consider for an ethically justifiable research set-up and execution. One issue is about the responsibilities of a researcher, which in part are transferred to the co-researcher. An example of that is the responsibility to inform and get consent from participants (and in the case of children from their parents). Respecting the privacy of participants and safe handling of participant data (such as recordings) is another example.
Another part of this is the greater distance between lead researcher and participants,

which challenges the communication. E.g. if co-researchers choose their participants, how can a lead researcher find them back afterwards to communicate results? In case of complaints, can a participant reach the lead researcher? How can appropriate safety be assessed or measures taken, if the lead researcher does not personally know the location and circumstances of the interview?

A question behind this issue is to which extent the co-researchers can actually be regarded as doing research – rather than as participants being intensely immersed in the subject through research activities. Is there much difference between how children would interact and communicate normally, and the specific interaction they have while taking on the researcher and participant role? And can children be trained – and expected to abide by – the rules of conduct of an ethically correct researcher? How much supervision and safeguards can a lead researcher organize within this setting? And what risks exceed those of daily life and specifically need extra attention? These issues are more complex in co-research than in regular user research.

Throughout the case studies I gained experience in a range of ethical situations and choices that occur within co-research. These experiences are translated in a list of questions that user researchers should actively consider when setting up a co-research project. The list consists of two parts, general questions and questions that are specific for co-research.

General questions:

- Does participation have a positive effect on the children?
- Is the topic of the research relevant to the children?
- Is the project fun and or interesting to them?
- Do both the parents and children have the opportunity to give consent to participate and record data?
- Do children have the opportunity to quit? Is this clearly communicated?
- Are children kept updated with the results?
- What are risks of the set-up of the research and how can these risks be limited? Is there a safety net in place in case of issues?

- Is clearly and often communicated to the children that their input is valued and appreciated?

- Do the children understand what will happen with their input?

Specific for co-research:

- Do the participants (recruited by the co-researchers) understand the research and do they want to join?

- Are the participant's parents asked for their consent? Is it feasible for the co-researchers to arrange this consent? Is it ethically justified to give this responsibility to the co-researchers?

- Is it safe for the co-researchers to do the interviews? Do they understand that they should not just go to strangers?

- Do the co-researchers understand that they can erase data if they want?

- Can the co-researchers share private information from participants in an anonymous way?

- Is it clear to both the co-researcher and the participant what will happen to their input?

In answering these questions, the researcher needs to consider the risks of participation (e.g. are the risks greater than what the participants are exposed to on a daily basis), the safety measures that are available in the specific context in case of problems, the expected direct value of participation and the value for children and society at large of their inclusion. The safety of children should be secured, however, practical difficulties or pre-set rules should not lead to unwanted exclusion or deprive children from the opportunity to have a voice in innovation that concerns their lives or the lives of peers and generations to come.

6.7 ANSWERING THE RESEARCH QUESTIONS

The framework in *figure 6.1* brings together insights from the case studies and visualizes the unique position of the co-researcher in between the researcher and the participant that brings along competencies and opportunities that can enrich a contextual study.

Co-researchers have access to the context of use and people in it. When co-researchers see the relevance of a project, develop research skills and gain confidence, they can truly adopt the role of researcher, which changes their mind-set and enables them to become amplifiers in the contextual study: helping participants to express themselves and enhancing data by adding context and sharing existing knowledge. To conclude this framework, the research questions from chapter 4 are answered:

RQ 1 - Which research competencies do co-researchers need? How can the co-researchers be trained and how do these competencies influence the contextual research?

Overall co-researchers are capable researchers, they are serious and patient, handling their participants with care. To get insight in the shared context of the co-researcher and the participant semi-structured interviews are an effective method. Co-researchers can quickly learn how to do interviews and like to use this method because it enables them to show off their role of researcher to people close to them. A short training is needed for the co-researchers to understand what kind of follow-up questions are interesting to ask and how more detailed answers can be obtained from participants. Without a guided training session the interviews are shorter and the obtained answers are less relevant.

Next to developing interview skills, co-researchers need to see the relevance of their task and build confidence in their role. A training session with a small group of co-researchers has proven to be effective on these aspects. Three ingredients of such a training session are: making the interviews their own, sharing interview tips and tricks and practicing the interview. Building relevance and confidence is not restricted to the training session. Incorporating the co-researcher's expert role in the attitude of the lead researcher also increases relevance and confidence. Asking and using the input from co-researchers shows them that they are valuable and appreciated.

RQ 2 - What is the influence of a personal relation between the co-researcher and the participant on the research? What is the difference between employing a co-researcher from the intended target group and one related to the target group?

Co-researchers are able to gather and enrich personal stories from their participants because of their close relation. Participants trust the co-researchers and feel free to say what they want. They are committed to help the co-researchers and let the co-researchers in their role.

Next to that, co-researchers can look at shared memories from the research perspective. The process of becoming a co-researcher increases their knowledge of the research topic and they can help participants to express answer that are relevant to this topic.

Co-researchers from the intended target group add more value to the contextual data than co-researchers who are not part of the target group because their own experiences and their additions to answers of participants are relevant to the research topic.

Sometimes, co-researchers project their own ideas and experiences on the answers of participants, for example the children that projected their own needs on elderly in case 3. When the co-researchers are from the target group themselves their ideas are relevant, and possibly their role as co-researcher served to draw these ideas to the surface. When the co-researchers are not from the target group they might filter out valid ideas from regular participants, with the risk of distorting the research.

RQ 3 – What are the effects of co-research on access, content and motivation?

The concepts of access, content and motivation are strongly intertwined. Because of their personal bond, co-researchers have access to participants and are capable of helping participants to express personal stories. Co-researchers from the intended target group can develop into “super participants” that share related memories about themselves and their peers that were not obtained during the interviews. They also enhance data gathered from participants by adding extra information and other examples or arguments.

The role of researcher, and showing it off to others, is motivating. This motivation can be reinforced with professional looking tools that strengthen the role of co-researcher and by acknowledging and using the expertise of the co-researcher in the set up of the research materials.

RQ 4 - What part can co-researchers play in the different research phases?

Co-researchers can play a part in each of the research phases: preparation, gathering, analysis and communication. Both in the preparation and analysis phase the co-researchers need to be guided by a researcher. In the gathering phase co-researchers are able to perform independent but need to be facilitated by tools. How much they are involved in the preparation and the analysis phase depends on two things: the goal of the study and the relevance to them. When the goal of the study is to understand the target group and explore different directions and opportunities, giving co-researchers freedom in the preparing phase by letting them decide the research goals and materials leads to valuable surprises; if the goal of the study is more focussed, too much freedom in the preparation phase leads to irrelevant content. Co-researchers play their part in the analysis and communication phase during the feedback session where they present their enhanced results in a condensed and more directed way. The co-researchers only perform the first step of analysis. Further analysis needs more profound techniques like transcription, coding and clustering, which is not in the interest of the co-researchers.

Next to answers to the research questions, the case studies yielded a range of experiences and practical lessons that are valuable for practitioners. *Table 7* provides an overview of the procedure to inspire design researchers that want to conduct co-research themselves. Guidelines for each step in *table 7* can be found in the accompanying text-box. This is not a fixed method since every case is different and flexibility towards the co-researchers and the context of the research is necessary.

Table 7 Overview of the co-research procedure

STEP	RESEARCHER	CO-RESEARCHER	PARTICIPANT
1. Set-up	**Preparation** - Scope the research - Plan project - Recruit - Make materials - Arrange informed consent		
2. Kick-off	**Gathering** - Present project + planning - Emphasize expertise of co-researcher - Facilitate input from co-researcher - Record insights	**Preparation** - Develop mind-set and motivation - Give input for research materials	
3. Training	**Gathering** - Train co-researcher - Explain and distribute research materials - Give tips + tricks - Coach - Record insights	**Preparation** - Develop interview skills - Practice interview - Build confidence	
4. Interviews		**Gathering** - Plan and conduct interviews - Facilitate participant - Fill in research materials - Record	**Participation** - Participate in interview - Share experiences, wishes and needs
5. Feedback	**Gathering** - Provide structure for feedback - Facilitate - Record	**Analysis + Communication** - Share results - Enhance results - Combine and compare insights - Hand in materials and data	
6. Analysis	**Analysis + Communication** - Analyse interviews and sessions - Give feedback to co-researchers and participants - Communicate to design team		

GUIDELINES FOR CO-RESEARCH

These guidelines belong to the activities in *table 7* and can help user researchers to set-up their own co-research project. The guidelines are drawn from experiences in the case studies and are therefore tailored to working with children. Most of them are probably useful for other target-groups as well. However, the guidelines are not tested with other target groups.

1. SET-UP

Planning

- Only conduct co-research when there is enough time (at least 5 weeks if the co-researchers meet once a week, excluding recruitment) and resources (recorders, materials, researchers) available. Preferably, start 2 months before the outcomes are needed
- When making a planning for the co-research process, discuss it with schools and possibly parents. Especially when working with a day care centre the planning needs to be flexible
- If the feedback session needs to be postponed, take into account that the lessons from the training session might be forgotten when they conduct the interview
- Plan the sessions close together, preferably one week apart.
- Plan short (1 hour) and active meetings
- Choose a convenient location that is easy to reach for the co-researcher and that is not distractive, for example a school
- Work in small groups (4 a 5 co-researchers)

Recruitment

- Doing the recruitment personally is beneficial because personal contact helps to gain the co-researchers' trust
- Explain the benefits of participating in the research to the co-researchers.

- Get informed consent from co-researchers and their parents
- Consider how the target group of the project is represented in the co-researchers and participants. When working with a school, teachers tend to select children based on how outgoing they are or on if they can skip a lesson. This might not be one of your criteria
- When recruiting through a contact person, discuss expectations, feasibility and amount of work before starting

Give direction:

- Choose a research focus for the co-research project
- Make sure the topic is relevant to the co-researchers
- Make the research materials, find a balance between open assignments and giving structure to the interviews, leave room for the input of the co-researchers
- Pilot test the research materials

2. KICK-OFF SESSION

Goal:

- To develop the mind-set and motivation of the co-researchers
- To evoke the co-researchers' curiosity about possible outcomes
- To emphasize the professional role and expertise of the co-researchers
- To get first insights in the target group

Activities:

- Take on the role of active facilitator
- Introduce the project and the researchers
- Discuss the planning of the project
- Show the relevance of the research for the co-researchers, for example by discussing possible outcomes if their research and letting them find out that they do not know which answers they will get

- Get input from the co-researchers on the research materials and provide structured materials to facilitate this
- Record the session

3. TRAINING SESSION

Preparation:

- Develop the research booklet, including interview and do-assignments that take up to 30 minutes in total
- Start the research booklet with short and easy questions to give participants and co-researchers time to get used to the setting
- Develop the research kit, containing the recorder, the booklets, pens, a tripod, charger, etc.
- Pilot test the research booklets

Goal:

- To develop the interview skills of the co-researchers
- To show the co-researchers what interesting topics and questions are
- To motivate the co-researchers by making them curious about the real answers from participants
- To give co-researchers confidence to do the interviews
- To enhance the professional role of the co-researchers by showing them their advice is incorporated in the research materials

Activities:

- Share interview tips and tricks
- Explain and distribute the research kits and recorders
- Provide role-enhancing tools like notebooks
- Show how the input from the co-researchers is used in the research materials

- Coach the co-researchers while they practice the interview on each other
- Guide the co-researchers in choosing participants and research environments
- Encourage co-researchers to only interview people they know and trust
- Explain about informed consent and how to get it from participants
- Help the co-researchers to plan the interviews
- Link the tips and trick to the co-researcher's own experiences
- Build the co-researchers confidence by giving encouragements and compliments
- Practice with the co-researchers how to introduce and start the interview
- Show how to use the recorder and explain what to record
- Practice reporting in research booklet
- Give examples of interesting topics and questions while coaching the co-researchers
- Explain to the co-researchers how they can delete recordings if they don't want to share them

Interview tips / Tell and show the co-researchers to:

- Focus on details they might already know but that the researcher does not know
- Take the freedom to ask questions they want
- Use open questions, elaborating and clarifying questions
- Listen well and give cues that they are listening
- Ask for details and more precise answers; don't be satisfied too soon
- Use silences and pauses to encourage participants to tell more
- Ask participants to think out loud if there are a lot of silences
- Focus on stories instead of the exact questions
- Record the session and leave the recorder on while rounding off the interview

4. INTERVIEWS

Goal:

- To capture the conversation between the co-researcher and the participant
- To facilitate the co-researcher to do the interviews
- To help participants express their experiences, needs and wishes

Activities:

- Be available for questions and support
- Give co-researchers the opportunity to refresh the lessons from the training, for example by going over notes or reading the tips again
- The co-researchers recruit participants, plan and conduct the interviews
- The co-researchers ask if the participants want to join and if they have permission
- The co-researchers record the interviews and fill in the research materials

5. FEEDBACK SESSION

Goal:

- To collect the research materials and recordings
- Let co-researchers share their experiences and insights, add context and compare themselves with participants
- Let co-researchers perform a first step in the analysis by selecting and combining insights, for as much as the activity is in the co-researchers interest
- Thank the co-researchers

Activities:

- Provide and facilitate a structure to the co-researchers to share their insights, for example questions or a mind-map
- Provide and facilitate a structure to combine and compare insights, for example a persona template
- Ask the co-researchers to hand in materials and recorder
- Hand out certificates
- Record the session

6. ANALYSIS

Goal:

To translate the data into design inspiration and information and communicate them to the design team

Activities:

- Transcribe and analyse the data from the interviews and the sessions
- The advantage of the interviews is that they give inspiration and empathy for the target group. The advantage of the feedback sessions is that the content is enriched and condensed
- Provide feedback about the results to the co-researchers and if possible to the participants and give them the opportunity to react
- Communicate results to the design team

CHAPTER 7 - LOOKING AT THE APPROACH AND INTO THE FUTURE

7.0 INTRODUCTION

This chapter looks back at the research presented in this thesis and reflect on its contributions to theory, design practice and education. Finally, after a reflection on the research approach used in this thesis , opportunities for future research that fit current societal trends are discussed.

7.1 REFLECTION ON THE CONTRIBUTION TO THE STATE OF THE ART

At the end of chapter 3, the research in this thesis was situated within the state of the art of involving children in design. This section reflects once more on the contribution of this research to the state of the art and especially to the work in the CCI community, where most of the literature on involving children in the design process was found. After completing the case studies, I believe the following three aspects are the main contribution of this thesis.

1. Giving children the role of researcher
If children are involved in research activities within the design process, their focus is often limited to their own surroundings and experiences (f.e. Gielen, 2013; Bekker et al. 2003; Read et al., 2012). By explicitly receiving the role of researcher in co-research, children focus on other people and on collecting stories. It turned out that children can combine input from multiple people and compare this to their own experiences. So by listening to others, the children develop an understanding of different points of view on the research topic and reflect on what is important to them.

2. Co-researchers have an influence on the user insights
Another contribution is that co-researchers influence user insights in three different ways. At the start of the process, co-researchers influence the gathered data by helping to define the questions that will be used in the interviews. When the interviews are conducted, co-researchers can help their participants to express themselves. And finally, the co-researchers are involved in the first step of the analysis, in which they can enhance the data by adding more context. Especially the involvement of children in the first part of the analysis of the user data is not often discussed or executed in current co-design literature.

Co-researchers have an added influence on the gathered data because they conduct research in the context of use, on the user's turf. The recordings they make capture real conversations

and interactions between children, without the influence of the user researcher. This relates to the next area of contribution:

3. Working with small groups and peer-to-peer interactions.
Approaches often used in CCI literature are intergenerational design teams (eg. Guha, 2013; Large, 2006), or co-design sessions with a whole school-class at the same time (eg. Van Mechelen, 2015). A contribution of this thesis is the combination of peer-to-peer interviews and sessions in small groups of children, facilitated by a user researcher.

This combination makes it possible to, on the one hand, let the user researcher steer the results, and on the other hand, give freedom to the co-researchers to contribute their own perspective. In the sessions with small groups of children, the user researcher explains the kind of information the co-researchers should look for. Working in a small group makes it possible for the user researcher to influence the group dynamics, which can be a problem in child-design teams (van Mechelen et al., 2015). However, the actual conduction of the interviews is performed without the presence of the user researcher. The co-researcher is in charge of performing the actual interview.

7.2 REFLECTION ON KNOWLEDGE AIM

The aim of this thesis was to develop knowledge about the ways inexperienced people could conduct contextual research in a familiar social atmosphere. Findings from eleven case studies were organized in a framework that shows relevant elements of co-research. User researchers and designers can use the resulting knowledge to gather undiscovered user insights, enriched by contextual knowledge of peers. The research in this thesis is mainly conducted with children as co-researchers but is also valuable for user research in general and for co-researchers from other target groups.

Framework applicable to research in general
The research in this thesis served as a magnifying glass and enlarged issues user researchers deal with. For example projecting own experiences on participants, asking solution focused questions or pushing ideas in creative sessions, are attention points in the training of all user researchers, not just co-researchers or children. The framework is therefore useful for user researchers in general. Seeing relevance, developing skills and confidence, putting on the researchers' role, helping participants to express themselves and enhancing data is something all user researchers need to do. Also the pitfall of projecting own assumptions on the answers from the target group is something novice user researchers need to be aware of.

Co-researchers don't have to be children

Most of the co-researchers in the case studies were children. Differences in working with adults compared to working with children are that adults have a longer attention span and more abstract thinking capabilities. It is harder to recruit adults to join a project since they are not so neatly organised in schools as children are. The little experience gained with co-researchers from older target groups showed differences in motivational aspects and the influence the co-researcher and participants have on each other, but the main aspects of the framework stay the same when working with other target groups. Just as children, adults have to develop skills and motivation and have to see the relevance of a project to adopt the role of co-researcher. And professional tools that underline their role also help them, in case 4 we even saw adults showing off to friends.

7.3 REFLECTION ON VALUE FOR DESIGN PRACTICE

The academic setting of the research in this thesis provided the opportunity to control conditions, iteratively explore tools and techniques, involve the researchers and co-researchers in extensive reflection and made it possible to compare studies since they followed the same approach. In design practice this kind of experimentation is difficult to achieve, since it is uncertain if the results will be usable and time for reflection is a scarce resource. It is the task of academics to do this kind of exploration and come up with tools and approaches that are useful in design practice.

Projects that could benefit from co-research in design practice are projects that have at least the first, and preferably more of these characteristics:

- are interesting to and valuable for the target group.
- need inspiration and direction from the users' perspective.
- aim to explore a certain topic with deep qualitative insights.
- aim to involve the target group in setting up and conducting user research and have the freedom to be surprised by the input of the target group
- need insight in the interactions between peers

- need real-time reflection of users on environments, objects or activities
- aim for longer involvement of users in the design process.
- require empathy towards the target group
- need to limit the presence of an external researcher because it would disrupt the social dynamics of the users.

The next step towards use in practice is using, testing and adjusting the approach.

7.4 REFLECTION ON VALUE FOR DESIGN EDUCATION

What I did not expect at the start of this project was the interest of design students in co-research. I expected co-research to be too complex for students learning the basics of user research, because another role is added. This turned out not to be true. Six master students of Industrial Design Engineering used co-research in their graduation project, of which I supervised three. Next to these students, more than 15 MSc students asked me to mentor or advise them on co-research projects with a range of target groups, because they though co-research would be useful in their project. Although I could serve them with occasional advice, unfortunately I did not have time to help them all extensively.

Presenting the case studies to students and sharing experiences in lectures and meetings lead to positive reactions. Some of the tools developed in this thesis were used in education as well, like the persona templates in case 2.

Primary schools were also interested in co-research, they were eager to join the case studies and one school used some of the tools themselves, solely for educational purposes. Adapting the co-research method to an educational method to teach research and design skills to primary school students is a direction for future research (see section 7.6).

7.5 REFLECTION ON THE COMPLICATIONS OF FIELD RESEARCH

Five of the eleven case studies in this thesis were embedded in the ProFit project, which is funded by the European Union, under the Interreg IVB North West Europe program. At the start of this project, user needs were seen as an important factor in the development of new design concepts in the international FieldLabs. For some of the partners in this European project the research conducted by the author was a first introduction to a user centred way of developing new innovations and it changed their view on the input users can have on innovation, which was the main value of co-research in this project. Implementing user centred design insights, however, was not an easy step for all involved. Although greeted with enthusiasm, in some cases the insights did not have a strong impact on the developed concepts. If users had been more involved throughout the whole process, instead of the start and evaluation, and were more in the sight of the designers, I expect that the impact would have been bigger. Nevertheless, design from user insights is a separate step that was not part of this thesis and is a promising direction for further research.

Within the context of the ProFit project, we experienced that it is difficult and time consuming to recruit participants every time a research question pops-up. Putting users in the role of co-researchers gets them involved and responsible and might be the first step in creating a community of co-researchers around each FieldLab to represent the users as stakeholders in the FieldLab (Atasoy et al., 2013). In order to keep this group motivated over time the people in it need to feel that their contribution is important and appreciated and they need to feel connected to the FieldLab and its focus. The elderly and children from case study 4 felt this connection: they kept track of what is going on in the FieldLab and knew for example which new products were installed. When the FieldLab in Delft was opened, after the evaluative research, they were all invited and four out of eight were present.

7.6 REFLECTION ON THE RESEARCH APPROACH

The research in this thesis was explorative in nature and investigated the use of co-research and issues that came up while using it by conducting qualitative research in the form of case studies. Rich data was gathered with small groups of participants (from 5 up to 30 co-researchers) in project specific case studies. The combination of these studies gave a more general picture, which was consolidated in the framework.

Internal validity was reached in the studies by triangulating the findings. In each case study, two researchers selected quotes from the transcripts individually and compared them. Results from the analysis were discussed with two or three researchers in each case study. Different data sources, like recordings, transcripts and notes from the co-researchers and from the user researchers, were used for the analysis.

The user researcher who conducted the case study varied. In some case studies I was not involved in conducting it, making my influence smaller. And in some case studies I did everything, so I knew what was going on and could experience every detail. By involving other researchers and letting them set up, conduct and analyse their co-research study, I involved them in shaping the co-research approach, so in a way I used a participatory approach in the thesis research as well.

External validity was achieved by including eleven cases with different schools, co-researchers, user researchers and topics. In terms of generalization, the variation in studies and their relation to the framework makes it likely that similar effects will be found in other cases. The findings in this thesis are limited to West-Europe, for applicability to other regions more research is needed.

The project, and especially giving a vulnerable group (children) a research responsibility, brought a number of ethical problems in focus: who should give informed consent, and what exactly is 'informed'? Can this responsibility be delegated to co-researchers or should it be used in another way? I was fortunate to embed my research in the relatively safe-haven of school environments, but translating this work to practice requires a more efficient way.

Looking back to the state of the art described in chapter 3, this thesis adds:

1. *A theoretical model about involving children in design as researchers*

2. *Descriptive case studies showing the set-up and conduction of co-research projects and reflecting on the added value of children as co-researchers*

3. *A list of guidelines for practitioners who want to use co-research*

7.7 FUTURE WORK

Next to developing and testing co-research in design practice, other directions for future research can be distilled from this explorative thesis and from societal trends in which co-research can be of value. First, the involvement of co-researchers can be expanded to other target groups and to other phases of the design process. Next to that, the personal development of the co-researchers, which was not a goal of this thesis, was highly appreciated by schools and is a direction for further development. And finally, the co-research approach described in this thesis could be useful for municipalities that want to empower children to have influence on their surroundings.

Expanding the involvement towards other phases of the design process

In this thesis, co-research has worked effectively for contextual design research, to get user insights and discover design directions at the start of a design project. However, case 4 showed that co-researchers could also play a part in evaluative research. So, the developed skills, motivation, ownership and familiarity with the project of a co-researcher can be valuable in other phases of the design process as well. Next to that, elongating the role of co-researcher from the fuzzy front end to the entire design process might help to give the user insights a bigger influence on the final design. Further research could investigate what happens if attention is paid to skill development and preparation of users for an extended role throughout the design process. I believe paying attention to the users skills is essential for co-design to be effective.

Design skills in primary education

While conducting the case studies in this thesis, schools were enthusiastic about the educational benefits for the children who were involved as co-researchers. On an international level, voices are raised to innovate primary education and incorporate the development of 21st century skills that everybody should master in the future (European Council (2005)).

Dutch policymakers and educators (e.g. PO-raad and the Stichting Leerplan Ontwikkeling) emphasize the promising features of design education as a vehicle for the development of 21st century skills (Advies Verkenningscommissie Wetenschap & Technologie, 2013). The opportunities for personal development that were found in this thesis led to the development of a new NWO/NRO funded project called "Co-design with kids", which started at the end of 2015. The aim of this project is to develop a toolbox inspired by tools from the design field, e.g. co-research, to enable primary school teachers to guide children during the design process in a way that stimulates the development of empathy, of divergent and convergent

thinking and their self-direction, and that facilitates communication & collaboration in heterogeneous groups.

Empowering citizens

Children should be enabled to participate in research and design concerning their lives and environment. This view is supported by article 12 of the UN convention of the rights of the child, which states that children have the right to form and express their views in all matters affecting them.

According to Dedding and Moonen (Dedding et al., 2013 chapter 1) participation strengthens the involvement in society and understanding of democracy, which leads to a healthy and strong community, and especially in case of children it adds to their personal development as well. To quote Kellett (2005): 'the concept of children as active researchers is rapidly gaining credence in response to changing perspectives on children's status in society'.

While working on this thesis, trends on a national and international level emerged that are connected to certain aspects of co-research. The Dutch political climate steers towards participation of citizens in their community, to let them shape and influence their own environment. However, many municipalities don't know how to facilitate their citizens to participate. Facilitating citizens to investigate their needs and those of their peers and turning insights from that research into design directions or ideas are aspects that municipalities find inspiring in co-research. Also on a European level, empowering citizens, and children in particular, to influence their environment is a rising topic. Future research could develop an approach, inspired by co-research, to help municipalities to facilitate and empower their citizens.

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SUMMARY / SAMENVATTING

SUMMARY

This dissertation investigates how users, and particularly children aged 8-12, can play an active role in research related activities in the design process. The work focuses on contextual user research at the start of the design process, which aims to get an understanding of the lives, wishes and needs of users in order to inform and inspire designers.

Just as adults, children have their own wishes and needs and it is important to keep those in mind when designing products and services aimed at them (Dedding et al., 2013). Children's experiences and thoughts are valuable input in the design process to ensure the end product fits their needs (Druin, 2002).

When children are involved in the design process they are often asked to perform activities like brainstorming, drawing ideas and making prototypes (e.g. Mazzone et al., 2013, Walsh et al., 2010, Guha et al., 2005). I expect that if children collaborate in research related activities in the design process, their input can have added value. Next to that I expect that children's conversations, without the direct interference of adults, can give an inspiring glimpse into their world.

After the introduction of the topic in chapter 1, chapter 2 describes hands-on experience with an established user research method (contextmapping) and served as a baseline for conducting contextual user research. This first-hand experience gave me the opportunity to find directions for co-research and to compare my work to the status quo. Opportunities for co-research were found in three areas: access, motivation and content. Expectations were that:

- Co-researchers can provide a relevant connection to people and to places
- By treating users as researchers they feel more responsible and motivated
- Co-researchers get different insights from participants because they are trusted

Involving users in research related activities in the design process has not been elaborately investigated in design research literature. In other fields, like citizen participation in urban development and social policy, user involvement in research is more common. After examining the reasons to involve users and especially children as researchers in social research fields, the level at which users participate in research and in what way users are prepared for their role, I position my own approach at the end of chapter 3.

Compared to existing literature on child participation in design the research in this thesis focuses more on involving children in user research activities than in ideation and it also involves children in the first step of the analysis of user data. Another aspect that makes this work different from the status quo is the use of peer-to-peer research. Where some researchers work with intergenerational design teams, this thesis searches for a combination of conversations between peers and sessions with small groups. A final addition this work makes is paying attention to skill development. This is an often-neglected part of involving children in design. I expected that preparing children for their involvement would increase the quality of their input.

Chapter 2 and chapter 3 explore field experience and literature. In chapter 4 these two are brought together in a framework that gives an overview of the aspects I wanted to focus on. This framework served as a lens to look through when conducting the case studies. The structure of the framework made it possible to determine if insights from the case studies were expected or if they are new and surprising. The framework covered 4 different areas (*see figure S.1*):

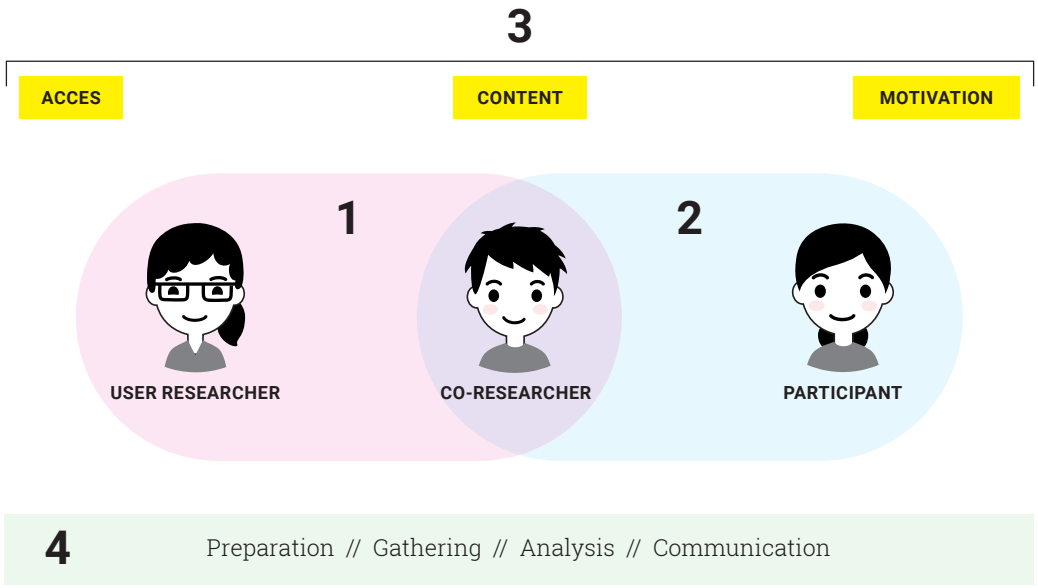


Figure S.1: Areas of the initial co-research framework

1 - The shared context of researcher and co-researcher
Which research competencies do co-researchers need? How can the co-researchers be trained and how do these competencies influence the contextual research?

2 - The shared context of co-researcher and participant
What is the influence of a personal relation between the co-researcher and the participant on the research? What is the difference between employing a co-researcher from the intended target group and one related to the target group?

3 - The effects of co-research on access, content and motivation
In what way does the co-researcher affect the content of the research results? What role does motivation play in co-research? What role does access play in co-research?

4 - The research phases and activities within each phase
What part can co-researchers play in the different research phases?

In the eleven case studies described in chapter 5, children conducted contextual research with peers. By conducting interviews, they increased their knowledge about people close to them and about themselves. Besides gathering valuable insights from their participants, the co-researchers accessed and shared their own experiences.

In chapter 6 the findings from the case studies were reviewed in order to evolve the framework from chapter 4 and answer the research questions. The areas of the evolved framework are described below and visualised in *figure S.2*.

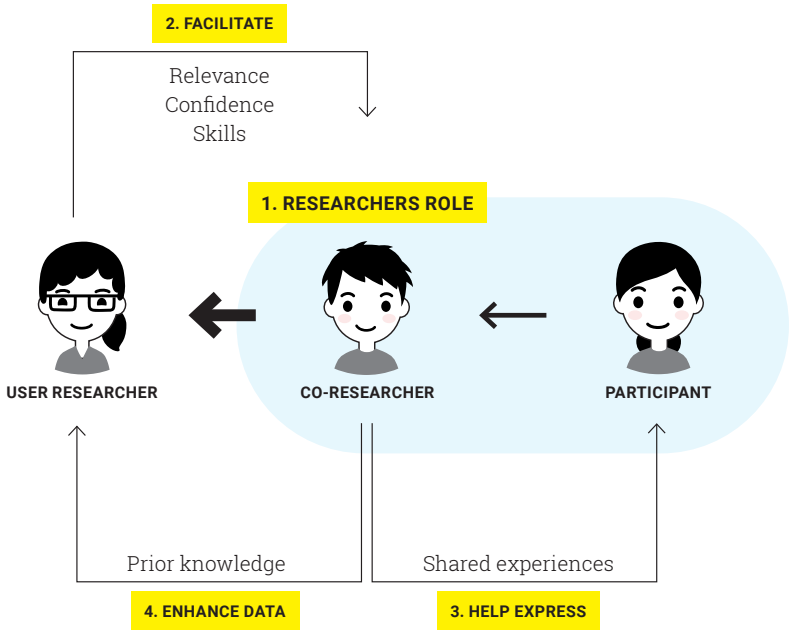


Figure S.2: Areas of the evolved co-research framework

Researcher's role

The researchers' role turned out to be the main motivator for the children to participate in the studies. When children adopted the role of co-researcher, they felt ownership and developed an involved and serious attitude. The case studies showed that the role of co-researcher comes with responsibilities, status and pride. Role-enhancing tools, like recorders, were much appreciated.

Facilitate

In the initial framework in chapter 4, the need to prepare the co-researchers for data collection was raised. Throughout the case studies a compact and effective way to train co- researchers for contextual studies was developed. Co-researchers were facilitated to adopt their new role by showing them relevance, developing their interview skills and increasing their confidence.

Help participants to express themselves

When the co-researchers saw the relevance of the project, developed interview skills and felt confident, they took on the role of researcher and helped participants in their interviews to express themselves. This happened on two levels. As expected in the initial framework in chapter 4, the co-researchers gathered personal stories because their participants trusted them and spoke the same language. Next to that, the co-researchers helped their participants to express themselves by deliberately steering the interview towards shared memories that they considered relevant. Because the co-researchers and participants shared their context of experience, and because the co-researchers had developed a more thorough idea of what was important for the research, the co-researchers knew what to ask. In fact, often the co-researchers asked questions to which they already knew the answer (but that answer was new for the user researcher, and relevant for the research).

Enhance data

In the initial framework in chapter 4, co-researchers were expected to develop a broader view on the research topic and get more insight in themselves by listening to others. This would mean that they add more to the research than only collecting and transferring stories from participants. This expectation was confirmed in the case studies; the co-researchers added their own prior knowledge to the research and enriched data from their participants. In other words, when children become co-researchers they turn into "super-participants".

The research in this thesis has yielded: a theoretical model about involving children in design as researchers, descriptive case studies showing the set-up and conduction of co- research projects, a reflection on the added value of children as co-researchers and a list of guidelines for practitioners who want to use co-research. Another output of this thesis is an ethical reflection on the case studies along three dimensions: procedural ethics, situational ethics and relational ethics.

SAMENVATTING

In dit proefschrift worden potentiële gebruikers (met name kinderen tussen de 8 en 12 jaar) betrokken bij het ontwerpproces in de rol van onderzoeker. Het onderzoek focust zich op contextueel gebruikersonderzoek aan het begin van het ontwerptraject. Dit soort onderzoek heeft als doel het dagelijks leven, de ervaringen en wensen van gebruikers in kaart te brengen en daarmee ontwerpers te informeren en inspireren.

Kinderen hebben, net als volwassenen, hun eigen wensen en ervaringen en het is belangrijk deze in gedachten te houden bij het ontwerpen van producten en diensten voor deze doelgroep (Dedding et al. 2013). In dit proefschrift zijn kinderen waardevolle informanten die er voor zorgen dat de ontwerper beslissingen kan nemen die in het belang van de kinderen zijn.

Als kinderen worden betrokken bij ontwerp, gebeurt dat vaak door middel van idee genererende activiteiten, zoals brainstormen, ideeën schetsen of het maken van prototypes (e.g. Mazzone et al., 2013, Walsh et al., 2010, Guha et al., 2005). Ik verwacht dat als kinderen betrokken worden bij onderzoeksgerelateerde activiteiten binnen het ontwerpproces, dit van toegevoegde waarde kan zijn. Daarnaast denk ik dat de gesprekken tussen kinderen, zonder tussenkomst van volwassenen, een inspirerende blik in hun wereld kunnen geven.

Na de introductie van het onderwerp in hoofdstuk 1, beschrijft hoofdstuk 2 praktische ervaring met een gevestigde onderzoeksmethode voor contextueel gebruikersonderzoek (contextmapping). Dit proefschrift is een studie naar tools en methodieken die van waarde kunnen zijn voor het ontwerpveld en het is uitgevoerd in gevallen die gestationeerd zijn in de daadwerkelijke praktijk. Ervaring met deze praktijk heeft me geholpen kansrijke richtingen te vinden voor co-research en mijn werk te vergelijken met de status-quo. In drie gebieden werden kansen gevonden voor co-research, namelijk: toegang tot de doelgroep, motivatie van de kinderen en inhoud van de resultaten.

De verwachtingen aan het eind van hoofdstuk 2 waren dat gebruikers in de rol van mede-onderzoeker:

- een relevante connectie met mensen en plaatsen kunnen verstrekken.
- zich verantwoordelijk en gemotiveerd voelen.

- andere inzichten kunnen verkrijgen dan "normale" onderzoekers omdat participanten ze kennen en vertrouwen.

Gebruikers betrekken bij onderzoeksgerelateerde activiteiten binnen het ontwerpproces is niet uitgebreid onderzocht in literatuur binnen het ontwerpveld. In andere onderzoeksgebieden, zoals burgerparticipatie binnen stedelijke ontwikkeling en sociaal beleid, is het gebruikelijker om gebruikers te betrekken in de rol van mede-onderzoeker. Nadat ik heb onderzocht waarom, op welk niveau, en op welke manier, gebruikers (en in het bijzonder kinderen) betrokken worden in sociale onderzoeksvelden, heb ik mijn eigen aanpak gepositioneerd aan het eind van hoofdstuk 3.

In vergelijking met bestaande literatuur op het gebied van de het betrekken van kinderen bij het ontwerpproces, onderscheid dit proefschrift zich door te focussen op onderzoeksactiviteiten in plaats van op het genereren van ideeën. Bovendien worden de kinderen in dit proefschrift betrokken bij de eerste stap van het analyseren van de gebruikers data. Een ander aspect dat dit werk van de status quo onderscheidt is het gebruik van een-op-een gesprekken tussen kinderen in plaats van het werken met ontwerpteams waarin zowel kinderen als volwassenen vertegenwoordigd zijn (wat gebruikelijker is in literatuur uit het ontwerpveld). Een laatste toevoeging van dit werk is de aandacht voor de ontwikkeling van vaardigheden van kinderen, een stap die niet vaak toegepast wordt bij het betrekken van kinderen bij ontwerp. Mijn verwachting was dat het voorbereiden van kinderen op hun betrokkenheid de kwaliteit van hun input zou verbeteren.

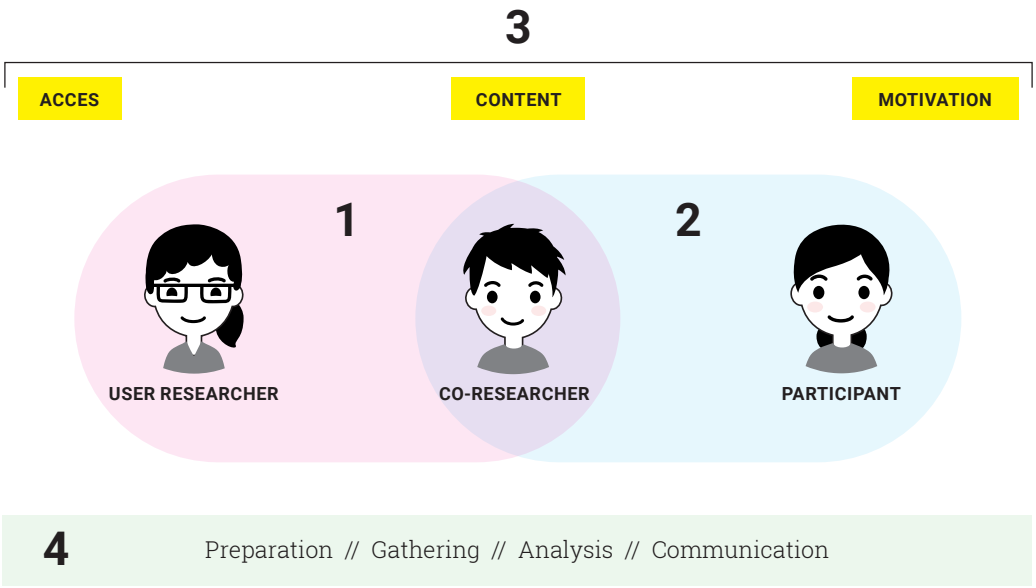
Nadat hoofdstuk 2 en hoofdstuk 3 ervaringen uit het veld en literatuur verkend hebben, geeft hoofdstuk 4 de aspecten waar ik me op focus weer in een eerste framework. Dit framework heeft gediend als bril om naar de case-studies in hoofdstuk 5 te kijken en om te kunnen bepalen of uiteindelijke inzichten verwacht of verrassend zijn. Dit initiële framework bestaat uit vier gebieden met bijbehorende vragen (zie ook ***figuur S.1***):

1. De gedeelde context van de onderzoeker en co-researcher .
Welke vaardigheden heeft een co-researcher nodig? Hoe kan een co-researcher worden opgeleid en hoe beïnvloeden zijn vaardigheden het contextueel gebruikersonderzoek?

2. De gedeelde context van de co-researcher en de participant
Wat is de invloed van een persoonlijke relatie tussen de co-researcher en de participant op het onderzoek? Wat is het verschil tussen het inzetten van een co-researcher uit de beoogde doelgroep en een co-researcher met alleen een link naar de doelgroep?

3. Het effect van co-research op toegang, inhoud en motivatie
Op wat voor manier beïnvloedt de co-researcher de inhoud van de onderzoeksresultaten? Welke rol speelt 'motivatie' binnen co-research? En welke rol speelt 'toegang' binnen co-research?

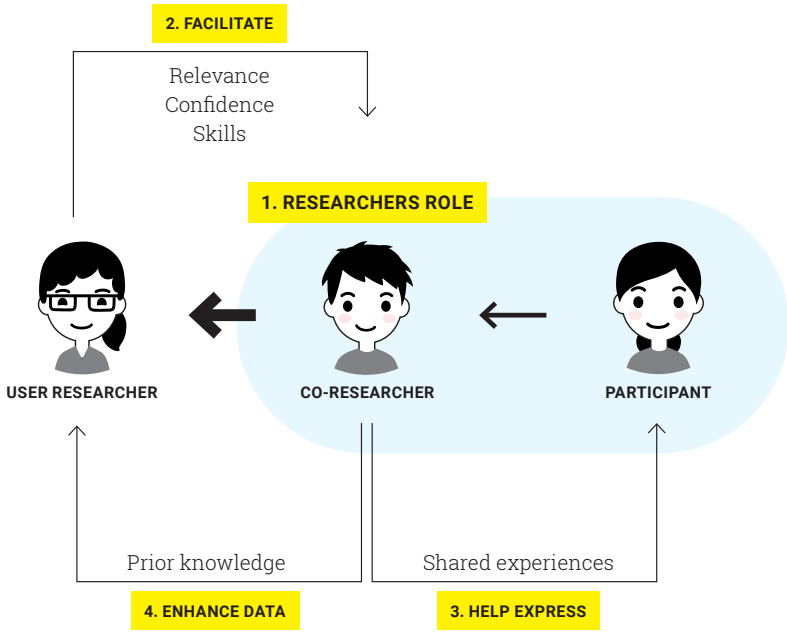
4. Het onderzoeksproces en de activiteiten binnen elke fase
Welke rol kunnen co-researchers spelen binnen de verschillende fases van contextueel gebruikersonderzoek?



Figuur S.1: Gebieden van het initiële co-research framework

In hoofdstuk 5 worden 11 case-studies beschreven waarin kinderen contextueel gebruikersonderzoek uitvoerden met leeftijdsgenoten of mensen die dicht bij hen staan. Door interviews uit te voeren vergrootten de kinderen hun kennis over henzelf en over de mensen om hen heen. Naast het verzamelen van inzichten over hun participanten, deelden de co-researchers ook hun eigen ervaringen.

In hoofdstuk 6 zijn de resultaten uit de case-studies gebruikt om antwoord te geven op de onderzoeksvragen en om het initiële framework te verbeteren. De gebieden van het doorontwikkelde framework zijn hieronder beschreven en worden geïllustreerd in ***figuur S.2***.



Figuur S.2: Gebieden van het doorontwikkelde co-research framework

De rol van onderzoeker

De rol van onderzoeker en de status en verantwoordelijkheden die daarbij hoorden bleken de kinderen te motiveren om mee te doen aan het onderzoek. Wanneer kinderen de rol van co-researcher adopteerde, bracht dat een gevoel van eigenaarschap met zich mee en ontwikkelden ze een betrokken en serieuze houding.

Faciliteren

In het initiële framework werd duidelijk dat het wenselijk is kinderen voor te bereiden op hun rol als onderzoeker en het verzamelen van data. Tijdens de case-studies is een compacte en effectieve manier van training ontwikkeld. In deze training worden co-researchers gefaciliteerd bij het adopteren van hun nieuwe rol door de relevantie van het onderzoek duidelijk te maken, door interview vaardigheden aan te leren en door het zelfvertrouwen van kinderen te vergroten.

Participanten helpen om zich uiten

Wanneer de co-researchers de relevantie van het project zagen, hun interview vaardigheden ontwikkelden en zich zeker voelden, konden zij hun participanten helpen om zich te uiten. Dit gebeurde op twee niveaus: zoals verwacht in het oorspronkelijke framework uit hoofdstuk 4, verzamelden de co-researchers persoonlijke verhalen omdat de participanten hen vertrouwden en ze dezelfde "taal" spraken. Daarnaast hielpen de co-researchers de participanten door ze bewust naar bepaalde gedeelde herinnering te leiden, die zij als relevant voor het onderzoek beschouwden. De gedeelde context en hun meer ontwikkelde beeld van wat belangrijk is voor het onderzoek zorgde ervoor dat de co-researchers wisten wat ze moesten vragen; daardoor stelden ze vaak vragen waar ze zelf het antwoord al op wisten, maar die zeer relevant waren voor de onderzoeker tijdens het terugluisteren van de interviews.

Data verrijken

In het oorspronkelijke framework uit hoofdstuk 4, werd verwacht dat co-researchers een breder beeld van het onderzoeksonderwerp zouden ontwikkelen en meer inzicht in zichzelf zouden krijgen door naar anderen te luisteren. Deze verwachting is in de case-studies bevestigd; de co-researchers verrijkten de data van hun participanten met hun eigen (gedeelde) ervaringen. Met andere woorden door kinderen in te zetten als co-researchers werden het "super-participanten".

Het onderzoek beschreven in dit proefschrift heeft een theoretisch model over het betrekken van kinderen in de rol van co-researcher opgeleverd. Daarnaast heeft het een aantal beschrijvende case-studies opgeleverd die laten zien hoe je een co-research project opzet en uitvoert. Ook wordt gereflecteerd op de toegevoegde waarde van kinderen in de rol van co-researcher en is er een lijst met richtlijnen opgesteld voor gebruik in de praktijk. Tenslotte is er in dit proefschrift gereflecteerd op drie ethische vlakken: procedurele ethiek, situationele ethiek en relationele ethiek

APPENDIX

APPENDIX A – ANALYSIS CASE 1

This appendix gives a glimpse of the analysis of case study 1. The process of analysis that is followed in this thesis is described in detail in the book Convivial Toolbox (Sanders & Stappers, 2013).

We started with: transcripts of video recordings of the sessions and audio recordings of the interviews, session notes, filled in persona templates, pictures of the research materials and the research booklets the co-researchers filled in. With these materials the following steps were taken:

Step 1: Make transcripts, highlight interesting quotes
Step 2: Make statement cards from selected quotes and explicit interpretations.
Step 3: Post materials/ pictures/session notes/ statement cards on the wall
Step 4: Construct main categories
Step 5: Construct sub categorıes
Step 6: Find connections between categories
Step 7: Report findings on category level, illustrated with quotes

Discussion with other researchers occurred at steps 1, 2 and 6.

The figures on the next pages give an idea of each of the steps.

Figure A.1: The pile of transcripts

Figure A.2: The selected quotes are cut out

Figure A.3: Statement cards are made by interpreting quotes and pasting them on post-its.

Figure A.4: Materials are pasted on the wal

Figure A.5: Researchers discuss the categories and materials

Figure A.6: Categories, sub-categories, relations and statement cards on flip-overs

Figure A.7: The category "Omgang" is translated on the next page. This category can be found in the description of case study 1 in chapter 5 under the heading “Social group”.

EXAMPLE OF ONE OF THE CATEGORIES

Relation between co-researchers
The mood was good in all groups, they were working together well and there was a sense of belonging to a group. The children gave each-other suggestions and tips to improve.

> ***Alex:*** *"Fien, I think you should go on asking more questions."*

> ***Eveline:*** *"I know a better question, a better way of asking that. If you would have to do something other then hockey, what would it be? Because you asked it like your parents would..."*

Sometimes the clues were a bit blunt:

> ***Jamil:*** *"Boring! This is taking a while with al the uhm... uhm..."*

The groups are motivated and correct other children that fool around.

> *"Jasper, quit in now! You are being really annoying!"*

Within the group there are lots of discussions about playground. There is an open atmosphere, where anyone can say anything. They are also speaking freely about themselves, this might be caused by the fact that this is not the goal now.

Because thinking up questions is hard?

They also talk freely about mischief. They talk about a girl they call "Barbie" because her head looks like a Barbie-head for example. Or tell a story about a pesky family where they squirt water trough the mailbox. Also noteworthy is that they know and understand each-others context. During practise the following conversation took place, to answer the question *"With whom do you play, and what is it you do together"*:

> ***Jasper to Tess:*** *"I thought you played with Bobby the most"*

> ***Tess:*** *"Yes that might be true, but from my girlfriends...*
> *Well Bobby is also a girlfriend but... "*

> ***Jasper:*** *"Sister."*

Jasper: *"And you play with Madelief."*

Tess: *"That's true, not a lot, but sometimes I do."*

Hanane: *"Evita."*

That seems to be the reason why they can partially fill in each-others questions. Especially if the questions regard their relationship.

This category can be found in the description of case study 1 in chapter 5 under the heading "Social group".

ACKNOWLEDGEMENTS

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ABOUT THE AUTHOR

At the age of 10, when most other children wanted to be a fireman or ballet dancer, Fenne decided that she was going to be an "industrieel ontwerper". When the other kids did not know what that was, she showed them her secret box of business cards, collected during an industrial design exhibition in Amsterdam.

In 2004, Fenne started at the faculty of Industrial Design Engineering at the TU Delft. She finished her bachelor in 2008 and started the master Design for interaction. In her graduation project for the public library DOK in 2010, she involved children in the design of a new book searching system. Together with Probiblio and Frens Pries she transformed this design into a website on which children can record short movies about books to inspire other children to pick a book to read (www.boekenbabbels.nl).

Once graduated, Fenne started working for design agency Hoog & Diep in Rotterdam as user-researcher/designer. After her experience in design practice she returned to the faculty of Industrial Design Engineering to become a PhD candidate within the European Interreg project called ProFit. In this project she involved children as co-researchers in design, enabling them to do research with peers in order to get insight in their lives that inspire and inform designers.

Fenne was co-applicant in several research proposals for funding. Two of these applications got rewarded. This resulted in the postdoc project she is currently working on: "Co-design with kids", funded by NWO/NRO. The goal of this project is to develop a toolbox to do design projects at primary schools for the benefit of both designers and children.

The other accepted project, called "Healthy by Design", is funded by Zonmw. This project aims to develop, implement and evaluate an intervention that changes the lifestyle behaviour of students at vocational schools.