Remote contextmapping and prototyping during lockdown, a study case.

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Abstract. In co-design, solutions are generated to serve people's needs, short term and/or long term, through their involvement in parts of the design process. Methods like contextmapping and explorative prototyping serve these participatory processes. They help designers to step into the users' shoes, to explore design solutions from and with their perspectives. In circumstances where contact with users is restricted, such as the recent lockdowns, user involvement is hindered and we need to find alternative ways to proceed with involving users in design processes. Instead of focussing on what is impossible because of the restrictions, we focussed on the opportunities it can bring. This paper shows that co-design is possible in times of a lockdown by deploying users in the role of co-explorer, creating ownership among users, using digital means, and obtaining an opportunity-oriented mindset.

Keywords: Contextmapping, Prototyping, Remote, Human-Centred design, Pandemic, Co-design

1 Introduction

Co-design involves people in the design process, by giving them a voice in what is being designed for and with them. The co-design approach developed from participatory design, which emerged in the 1970s and aimed to involve various stakeholders in the design process in order to integrate real-life experiences, needs, skills, knowledge and ideas of people that are affected by the solutions [22].

Methods to involve ordinary people are traditionally based on rather classic research methods, such as interviews, observations and focus groups [2], or can be more engaging in the form of design-led methods where users are invited to take part in activities during the design process [18]. Participatory design activities take place in everyday settings and mutual learning and construction of knowledge is acknowledged [14]. Here, designers become orchestrators of the collaborative design process and use their design skills to create assignments and activities to elicit, document and interpret fragments of everyday life in users' contexts [24].
Such activities are normally executed within the physical environment of the user group to get a clear image of everyday life and needs from the user's perspective. Because of

the COVID-19 pandemic, the government restrictions hindered user involvement within the user's context and therefore made exploring with people essentially impossible. In this paper, we address the question of how to apply these co-design methods and principles in remote ways. We welcomed the restrictions of the COVID-19 pandemic as a unique context to research this.

Literature on remote co-design suggest techniques such as mobile devices to exchange photos, recordings, messages in real context (see for example [11), but lacks insights into deployment of a full design project with remote involvement of users. Recent publications on participatory methods during COVID-19 share insights about the advantages of online cocreation tools such as Zoom (e.g., more friendly, less hierarchy) as opposed to offline cocreation sessions [16] or present toolboxes (e.g., for remote participatory planning [25]). These studies do not research a full design process from remotely exploring a design question co-exploring the users' context (contextmapping), to exploring design solutions using a remote iterative prototyping process.

We review a recent co-design project of the first author. Participants were given exploratory design tasks in various remote ways. The project was her graduation project and ran from the first moment of the first COVID-19 lockdown in the Netherlands. (see Table 1). Through reflection on the applied methods of involving users remotely in this project, lessons were learned for remote co-design in general. At the end of this paper, three principles are presented to guide remote co-designing approaches.

Table 1. Key insights of the graduation project taken as a case study in this paper.

Context of project The global crisis caused by the COVID-19 pandemic will shape not just our healthcare systems but also our economy, politics and culture [10]. Everyone has had to reinvent life during this period, and that - especially in households with children – has created friction, arguments, irritations and impatience [28]. But it has also brought new opportunities, new ways of living, and lessons we can take with us. ***Assignment*** Design a concept that supports families in cherishing the moments of togetherness and spending those moments in a valuable way, even if rhythms and routines are less synchronised and when living less in the moment. The focus is on defining the positive lessons learned during this forced isolation, within Dutch families. How can families take these lessons with them into their lives after the crisis? ***Requirements of the Design for Interaction Master*** To plan, organise and execute a human-centred design project by applying methods to develop a concept that meets user needs. ***Methods*** Various co-design methods from product and service design disciplines to generate insights and test concepts within everyday life contexts. Applied methods include contextmapping, Probes, ViP, iterative prototyping and cocreation [3]. Contextmapping supports users in eliciting and reflecting on their experiences through generative techniques [24]. Probes help to collect user fragments as inspiration for ideation [12]. ViP supports designers to conceptualise based on

insights from a future context [13]. Explorative prototyping and cocreation sessions support to explore and evaluate concepts together.

Duration 6 months (March-Sept) 2020

Participants 5 Dutch families with children aged between 3 and 14 living in isolation.

Ethical Issues The research activities involved a total of 24 participants, 11 of whom were children. All participants provided consent to share their personal fragments, according to the guidelines of the Delft University of Technology ethics committee procedure. Parents provided consent for the children. The data published in the graduation report [27] and in this publication is reviewed by the participants and all have provided full consent for publication.

Solution An exploration of the context of daily routines within Dutch families presenting the lessons learned during the first lockdown. The most important lessons these families have learned is to continue giving valuable meaning to the moments of being physically together at home. A potential design is made implementing the defined design criteria; reminding and transparency. The final concept is called The Pin Light (Fig. 1). The Pin Light helps families to stay abreast of each other's lives in their lives after the pandemic. It allows families to appreciate moments together at home, even after their busy lives have returned. It connects family members by creating a "moment of light", together.

Fig. 1. Drawing of the Pin Light in use. Turning on your personal lamp so that other family members know you are home.

2 How the process was orchestrated

The project consisted of three phases: 1) the context exploration, 2) the concept exploration and 3) the concept development exploration (Fig. 2). In all the phases, participants were involved to generate insights, to ideate and to test prototypes.
In the context exploration phase the everyday life of three Dutch families was explored using the method of contextmapping in remote ways. With contextmapping, designers follow a procedure of preparation, sensitisation, sessions, analysis, communication and conceptualisation [24]. Participants were recruited and invited to share their everyday

context with the designer. This led to directions for the next phase of the concept exploration. In the next phase, ideas were generated through an ideation session with participants. These ideas were further developed into concepts by the designer and by creating low-fidelity prototypes these concepts were explored in the daily family lives of the participants. In the last phase, the concept is further developed using prototypes and GIFs to explore and determine the specification of the concept together with the participants (Fig. 2 shows the three phases).

Fig. 2. The three phases of the co-design process.

The next sections will describe in more detail how the remote activities of recruiting participants, generating user insights, organising ideation sessions, testing early prototypes and evaluating the concept were executed in this project.

2.1 Recruiting participants

How to find and visit participants when everyone is in lockdown? In 'regular' design projects, designers often visit users' everyday contexts. During the lockdown no visits to any contexts were allowed, which made it hard to come in contact with people and find participants in real-life situations. The designer used online social-media platforms such as Linkedin, Facebook, Instagram and her social network to recruit participants. Much attention was dedicated to a graphic communication strategy and timing and frequencies of contact to invite and guide participants in the process, which is also advised by the participatory planning toolbox of Urban Design Collective (UDC) [25].

A flyer was digitally spread asking for families with children (with no specific characteristics) who wanted to share their daily routines during the lockdown for one week (Fig. 3).

Because no specific characteristics were stated, a variety of participants responded. Most families responded with enthusiasm on wanting to share and reflect on their daily routines during this unusual period. They did see it as an opportunity to discover positive aspects within the negativity of the pandemic. Three families were selected for the context exploration. These families were selected to work with a cohesive user group. The invited families have children above the age 2 (ability to speak) and up to the age of 14 (after this age, the pattern of doing things together with parents changes significantly [6]). After the registrations, it was possible to frame the exploration in more detail, adapting to each participants' characteristics.

The user group consisted of three families living in different cities in the Netherlands. The ages of the children varied between 3 and 14 years old therefore there was a variation in the phase of life and education. In one family there was only one parent involved.

Fig. 3. The flyer created to invite participants on online platforms, purposely using a positive tone of voice.

The flyer focused on spreading a positive message: learning from the crisis. The communication also used a personal tone of voice. The designer presented herself briefly on the flyer, with a portrait drawing and some background information, to create an open and personal atmosphere from the start. Last, a simplified visual process was shared on the flyer, giving the context of the project and making the participants part of the process.

2.2 Generating user insights

How can the context be explored in remote ways, with at least the same level of richness as being in the real physical context of the participants? Contextmapping is a design research approach to discover insights from the perspective of the users themselves, about experiences of people's everyday lives [24]. Understanding and empathising within the context is usually conducted within the physical context of the users through a process of sensitising, interviews and generative sessions. When restrictions hinder this way of working, adjustments within this method can be made.

Sensitising packages were designed to make the participants aware of their everyday experiences (Fig. 4). One week prior to the interviews, the families received a package delivered at their homes by mail containing a booklet with assignments for each family member, emoticon stickers and a selfie stick. These playful and diary-like assignments helped the participants to collect fragments of their everyday life, reflect on what they mean to them and helped them to become more sensitive to the topic prior to interviews or generative sessions [24].

Fig. 4. Contextmapping package with the sensitising booklets and a selfie stick of Maartje (mother in one of the participating families). Each family member received a personal booklet to write their name on, this being their 'personal diary'.

When the packages had arrived at their homes, the designer scheduled an online introductory meeting with each family to get to know one another, to get acquainted with the process and what to expect. This one-hour meeting on Zoom addressed the topic of the first assignment of the booklet (Fig. 5). The designer also performed the assignment herself (Fig. 6) to build an equal and personal relationship, sharing personal information from both sides. All meetings were recorded, for later transcription.

Fig. 5. Children also participated during the video calls, using the first assignments in the booklets.

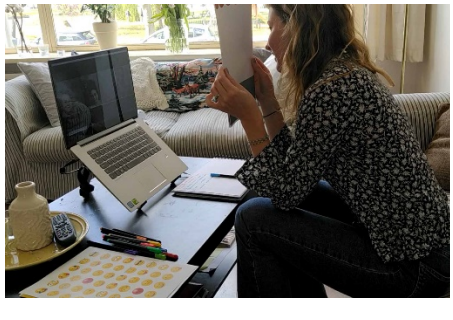

Fig. 6. The designer also shared her answers in her personal booklet.

The booklets contained various daily assignments to sensitise the families to the topic of valuing moments of togetherness at home, by self-documenting their daily routines during the pandemic. A different distribution of assignments per day was made for each family member (Fig. 8). Every day of the week a different member of the family was assigned the task of 'film director' (Fig. 9). The film director of that day determined what to record. The films they made were shared and distributed throughout the day.

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Fig. 7. During the interview the mother of the family started to laugh because she was distracted by one of her children who started to dance on the table to get attention. This made the vibe of the interview comfortable and fun.

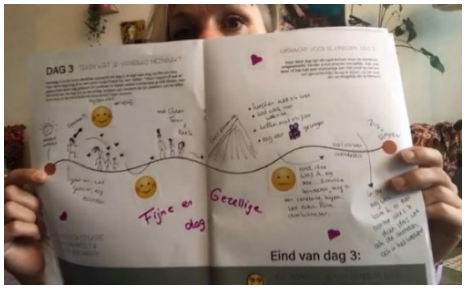

Fig. 8. A mother presenting her Journey assignment filled in on day three.

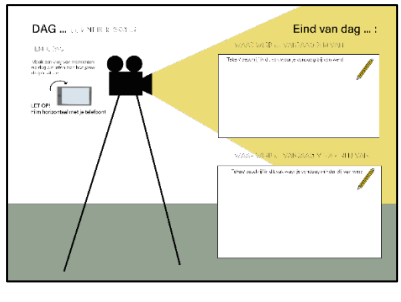

Fig. 9. The two pages of the 'Director assignment'. It contains instructions about how to film, and there is a reflection part to be filled in by the day's director.

The family members decided themselves what they preferred to share, offering a glimpse from their perspective. But the unselected parts of their experiences were not visible, because they were not shared.

After the sensitising period of one week, online interviews were organised to look back together at the assignments (Fig. 10). The designer created a video compilation of each family's input (photos and videos as parts of the assignments) and gave that back to the family. This served as initial input for the second conversation, which was recorded for analysis.

To let the families help in defining the most relevant insights, a final assignment was conducted in which family members had to share what they valued most. (Share what is best/funniest/most beautiful for you?).

Fig. 10. A retrospective interview by Zoom with a family, watching the edit of their week.

2.3 Analysis: making sense of the data

Table 2. Two insights distilled from the context research, substantiated with quotes from participants.

Seeing the value of being together. *"Doing things together is the most fun"* *"A home to be safe and cherished"* *"My boyfriend likes to be more at home now and to experience the things happening here."* *"I'm happy again when the kids are home"*	**A small world lets you appreciate little things more.** *"A holiday feeling at home"* *"Not going on vacation makes it different from normal, so suddenly you enjoy other things"* *"I'm going to miss the bubble"* *"What I like is that you enjoy the little things at home now"*

To make sense of all the data compiled, the designer conducted a Grounded Theory analysis [5] on the wall, or as Fig.11 demonstrates on the floor). Using statement cards, fragments of data were structured to find themes and patterns in the data [20].

All interviews and completed assignments were transcribed and printed. Having all the data physically close at hand (and rewatching the video data), taking multiple days, gave the opportunity to fully immerse in the participants' context in order to identify, bottom-up, themes for the concept exploration. Table 2 presents some examples of the themes derived from the analysis, illustrated with quotes from participants.

Fig. 11. The designer diving deeper and deeper into the data, by clustering, comparing and combining data from the context exploration.

2.4 Ideation session

How do you organise an ideation session while taking into account government restrictions during the pandemic? In this session the designer wanted on the one hand to deepen the insights she derived from the analysis of the sensitising phase, and on the other to ideate and explore directions for conceptualisation.

To get input from the user's perspective and explore suitable design solutions, an ideation session with a group of people, using generative tools, was organised. The aim was to generate inspiration and ideas and insights from the user's perspective about a fitting design solution. An ideation session can be easily organised in online settings using digital means like online whiteboard tools in a video call. But at this stage they were still rather new to most people, and they might not work with the participants, many of whom were young children. Moreover, the designer wanted the energy generated during a physical session by people being together.

The Dutch government maintained strict restrictions at the time the generative session of the case study was set up: inviting a maximum of three visitors to the home; everyone aged 18 and older had to keep 1.5 metres away from people aged 13 and older; residents at a single address did not have to keep at least 1.5 metres away from each other.

A setup for this session was created to look for opportunities within these restrictions. Meeting people was still allowed outdoors. A great opportunity was that the designer had a back garden that could be used. Therefore, adjacent gardens and a balcony were used to keep a safe distance between households, a co-creation session was organised with three different households (Fig. 12 and Fig. 14). Interestingly, the toolbox of UDC [25], also mentions 'balcony engagement'; using balconies and the open outdoor space to engage people.

The generative co-creation session was carried out using large double-size flip-over sheets (Fig. 13) and thick markers (to ensure that distance could be maintained while working together), making three groups according to the households, and using gardens and a balcony (Fig. 12 and Fig. 14).

Fig. 12. The designer facilitated the ideation session from her balcony. She orchestrated the session by keeping the time, telling the participants what to do, and observing the participants at work.

Fig. 13. Different households working together using double-size flip-over sheets to observe the 1.5-metre rule.

Fig. 14. Two families in contact with each other during the session.

The session was recorded on video and photographs. After the session an edit of these recorded materials was made and shared again with the participants to keep them informed about the process and double check whether the formulation of generated insights resonated with the participants.

2.5 Exploring design solutions

How to implement a remote way of explorative prototyping, exploring and designing together with participants on a remote basis? The intention of remotely exploring design solutions with participants was to create the experience of iterative co-designing with the users. Co-designing remotely was stimulated by starting the design development phase with early low-fidelity prototypes (a prototype that is in its early stages of conceptual and formal development) [17]) with some guidelines asking participants to interact and reflect on it. The prototypes were a way of giving the participants tools to co-design on a remote basis. The prototypes operate in the manner of generative tools (Fig. 15 shows an example). An important aspect of these tools is that they do not lose their imaginative qualities [9]. They are comparable to the approach of Design Fiction (DF), in which users (non-designers) reflect on future scenarios to speculate about innovations [1]. Speculating about designs allows us to design new things [9], explored by users themselves. The tools should propose, suggest and/or offer something, to sketch out possibilities [9]. Letting participants explore interactions with low-fidelity prototypes and letting them reflect on their experiences offers the designer a wealth of inspiration to use for the conceptualisation.

Two different low-fidelity prototypes were tested by five different families (Fig. 15 and Fig. 16 show the two prototypes).

A designer wants to see how the participants interact with the prototypes during remote explorative design development. Therefore, together with the prototypes, small assignments to explore and evaluate experiences of using the prototypes were provided. Again, the participants documented their experiences with video and photographs.

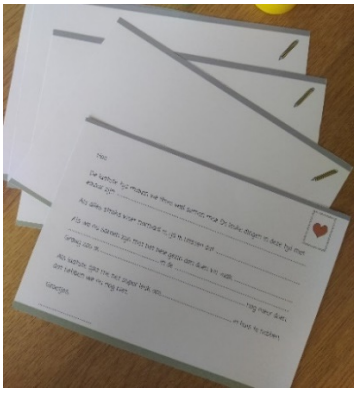

Fig. 15. A low-fidelity prototype; postcards with sentences that had to be completed.

Fig. 16. A girl using a low-fidelity prototype, by writing her own questions to her family members.

2.6 Final concept evaluation

How to keep the participants involved in co-designing and evaluating the final concept in a remote way, and to maintain the feeling of ownership of the process until the end?

To co-design the final concept, the participants were involved in a validation for inspiration. The goal of this approach of validation was to find inspiration to determine the concrete specifications of the final concept. Four different prototypes of the final concept were placed for one week with five different families to validate different shapes and interactions of use. Two new families were asked for the concept evaluation, both with two children aged between 3 and 14 years, both living in Rotterdam, one with a Dutch and one with a Turkish background. The purpose of this was to evaluate the concept in a broader perspective.

Different elements of interactions/use were evaluated. For example, ways of turning on a light, different shapes of the design, and different options of placing the prototypes in the families' homes (Fig. 17). Again, during the week the families self-documented their experiences and reflection by making videos and photos.

Fig. 17. A family using the concept idea of the lightbulb. They had to write questions on small cards about what they wanted to ask each other. The questions could only be answered when all lights were turned on.

At the end of the week an online interview was organised to reflect on the experiences using the prototype. The insights derived provided directions to detail the concept to suit the everyday context of the participating families, about usability, aesthetics and context. Some examples of statements from the participants:

- *"It has to be an easy interaction to turn the lightbulbs on and off. Touch was experienced as pleasant."*
- *"It would be nice if the lightbulbs could be placed near the dining table."*
- *"An optional addition should be a possibility to add or collect memories with the lightbulb, to feel more connected to the lightbulb."*

The input was translated by the designer into different final shapes with specific interactions of use. To make the final decision, the participants were involved again, by making them part of the final choice. The various designs were presented to the families using GIFs. The GIFs gave a brief overview of the possible interactions of the designs. All the family members in the four families of the test week voted for their favourite, with a brief list of reasons. This made the participants part of the selection process, even at a distance.

3 Lessons of remote co-design

3.1 Reflection on setting up the exploration remotely

Choosing a wide focus group by placing a request on social media platforms has proven to be an effective approach when a unique research circumstance suddenly arises, resulting in being less limited by rigid specifications for a target group. It was not certain how many people would respond during those strange times at the start of the pandemic. Choosing a cohesive research group out of the respondents to the request brought freedom in setting up the start of the project, so that everything could start quickly.

The positive tone of the communication strategy, and the carefully and well-crafted materials (in sensitising, ideation sessions and prototyping assignments) made participants willing to collaborate, and this resulted in positive cooperation with the participants from the start. People who relate to the positive type of message in the request will respond, and that results in a group of participants with the same positive mindset.

Sharing personal information from the designer's perspective using an online request creates a balanced exchange of information from the start. This results in an open connection with participants from the start, breaking the online barrier. Moreover, both provide expertise; designers are experts in the design process, and participants are experts in their everyday experiences. This research showed that people are more willing to share their everyday routines, thoughts and ideas when they understand that these anecdotes are relevant for the designer. Therefore a mutual interest and openness is promoted.

From the first moment of placing the online request, background information about the whole project was shared with the participants. Sharing information about the process makes participants not only the implementers of the method using tools provided by the designer, but also co-designers of the process orchestrated by the designer.

3.2 Reflection on remote generative assignments

An online meeting can be awkward and impersonal when people do not know each other. Using an icebreaker assignment, like drawing a picture of yourself, creates an open conversation in a natural way. Drawing also makes it easy for small children to

participate in the conversation. The introductory meeting is a valuable moment to build trust with the families, encouraging them to share personal information the following week through digital means.

With an interview conducted by video, distance creates a boundary, though it does offer a glimpse of the user's environment and daily interaction. The participants were in their own environment during the interviews. The children in particular felt comfortable sharing their everyday lives, and there were no boundaries to behaving as they normally do at home. Moments like minor disagreements between a brother and sister, bored children seeking attention. These provide a glimpse of everyday life, which would otherwise not be documented and shared so easily because participants are not always aware that those moments might contain relevant insights and inspiration for the designer.

The film recordings they made were shared and distributed throughout the day, allowing the researcher to be a real part of the family's everyday life, each day from a different perspective within the family.

Nevertheless, more was often shared in the videos than just answers to the assignments. They conveyed much more richness about the fabric of everyday life in these households. Family interactions, habits, relations, rules and norms were unintentionally shared through the videos. For the families themselves those elements are part of their everyday lives. In their experience they do not stand out as being rich data. But for the designer, getting so close and being able to observe in such detail what these families were going through helped in understanding what is valued and provided inspiration for the design phase.

The self-directed videos unintentionally contain lots of rich data shared by the participants, which turned out to be a valuable aspect of using videos made and directed by the participants themselves.

It is valuable to be aware of the directed and therefore selected editing of videos the researcher receives. The parents were therefore also asked to film daily, even if they were not the film director of that day, to get information from both perspectives.

Watching the videos together made by each family after the sensitising phase created a warm and personal moment with the families, even at a distance. The families experienced it as a special moment to look back at their everyday life. It created added value for them to reflect on their daily routines, something you do not normally do. From the researcher's perspective, a strong connection and understanding was developed, even though she had never met the family in real life.

Evaluating the videos generated a lot of interesting insights for the conversation. Including the families in evaluating their own research materials, they automatically were involved in the analysis of their own data. This strengthened their role of co-researchers. Making participants part of the process of generating insights created an extra layer of depth. It created a conclusion from their perspective.

3.3 Reflection ideation session

One of the most important aspects about setting up an ideation session, taking the restrictions into account, is an opportunistic mindset and attitude of both the designer and the participants.

Interestingly, at the start of the pandemic period, people experienced many new things in their daily lives, creating energy about things being new and different. This can be explained by the phenomenon of Hedonic Adaptation. Hedonic Adaptation concerns the notion that after a major positive (or negative) event, the positive (or negative) emotions increase, but later it flattens to a stable level of emotions [7].

The period of the COVID-19 pandemic brought major changes in people's daily lives, which initially created, as discovered in this research, a lot of new/positive energy.

This was noticeable during the co-creation session as well. Many elements of the session were unusual; the designer facilitating from her balcony, people discussing across the garden fence, huge formats to carry out assignments while keeping the 1.5-metre distance and the fun of working together physically at a time when this was very unusual. This setting resulted in a high level of motivation and energy from the participants.

After these intense emotions, we eventually return to the 'baseline' of our emotions [15]. For example, the feeling of happiness can be very high after winning a lottery, but after a few years the feeling of happiness is not much different than before [4].

Considering this, it could be that after a few times experiencing the unusualness of the setup of this generative session, it is experienced as normal again. Which means emotions return to the 'baseline' again, causing a lower level of motivation and energy during the session. Strength lies in doing the unusual, continuously shifting our standards in order to feel satisfaction [15].

This session also gave participants the freedom to share what they were experiencing in their daily lives during the lockdown. During the pandemic everyone was in the same boat, experiencing the same changes. Sharing this with each other and experiencing real understanding from others creates connections within the group of participants.

Besides this, making a video edit of such a session shows the opportunities and effort within the project, encouraging people from inside and outside the project to feel empathy with each other and make them willing to collaborate on this project

3.4 Reflection on remote exploring prototypes

Using low-fidelity prototypes creates a feeling of ownership and understanding from the participants' perspective, and a feeling of actually designing together. Making the prototypes modular and simple allows the participants to make their own interpretations and additions. Within a family, the children experienced how the other family members explore the prototypes differently. Interestingly, the children seemed much more committed to using the prototype and fully exploring its possibilities compared to their

parents. This resonates with the insights from Van Doorn's work on involving children as 'super-sources' in design processes [26].

The children were asked during the test week to observe and record everything they thought was interesting, as true co-explorers. In the interviews the children came up with many ideas, usually much more out of the box than those of their parents.

Letting participants self-document their interaction with the prototypes through videos and photos influences the way of interacting with the prototype. Therefore many small contact moments online to evaluate the exploration of the prototypes appeared to be valuable in understanding of the use of the prototypes.

Because of the reduced COVID-19 restrictions during the final phase of the project, four of the five interviews were held in person at the family's home again. Interestingly, during these interviews the children were much more timid compared to how they were during the online interviews. Apparently, the children experienced the previous (online) engagements with the designer as less intrusive than a real visit of a designer at their homes.

By being honest and creating an open atmosphere of giving opinions and sharing ideas, the participants become real part of the design and development phase, even at a distance. Empowering children to explore and co-design using the prototypes generates innovative and more out-of-the-box ideas. It is important to give children the feeling of being a real designer as well, by giving them a central role in the process [8].

Besides this, allowing participants to help make choices, by deploying easy-to-use digital tools, means that they can contribute at a distance, and maintain ownership during the final parts of the process.

4 Discussion

This project has shown how a collaborative design project can still involve users in various phases of a design process in alternative and remote ways. In this section we reflect on the findings of this study. We presented three main findings about executing a remote co-design process;

4.1 Inviting users in the role of co-explorers

In this design project it became clear that empowering the user as a co-explorer is an essential part of a remote co-design process. Self-directed videos about the daily lives of users shared throughout the day enable us to observe the context of the target group from a distance. Videos made by participants (the users) contain data that is unintentionally shared by the participants. This data facilitates a rich understanding of the user's context. To build trust among users to share personal information by digital means, it is valuable to get to know each other better from the start of the project, using an icebreaker assignment that is easy to carry out.

Additionally, asking different people to film at the same moments within the same context provides information from multiple perspectives and therefore provides additional background information about the user's context. It gives the designer the opportunity to compare materials made from different perspectives. The designer needs

to be aware that the self-directed videos and selected materials of the users may be biased or incomplete. For example, parents who decide not to share recordings made when the children are annoying or at moments when sensitive topics are discussed.

The interviews were performed most of the time in groups; one family at a time. We were aware that individual answers may be subject to influence during group interviews. Interestingly most of the interviews often revealed the same answers for both within and between the families.

We suggest that inviting users to take on the role of co-explorers can also be effective beyond the period of a pandemic.

4.2 Inviting users to be co-designers

Using small prototypes in the manner of an inspiration-validating tool creates a feeling of ownership and understanding from the user's perspective. Shared ownership creates support and commitment, which contributes to collaboration with users by giving them an equal role. Ideally, we would move from designing for people to designing with people and by people [21]. This project shows the possibility of designing together and creating ownership by users.

Creating a co-design mindset at a distance requires the designer to create an open mindset for sharing ideas and thoughts. In addition to this openness, the designer needs powerful designed resources, such as sensitisers, low-fidelity prototypes and clear instructions, to allow users to participate in the project on an equal level. The users are not respondents, but full participants in the project. Hence, the resources users receive are extremely important. These resources must be designed in such a way that users can fluently contribute. In addition to the designed resources, the orchestration (timing and frequency) of the process is a task of the designer. Planning and expectations need to be clearly communicated from the designer to the participants. By designing the right means and orchestration of the process, the user can co-design at an equal level and experience ownership of the project.

4.3 Opportunity-oriented mindset

The particularity of new norms, standards and ways of living during the first COVID-19 pandemic made users open up about their daily experiences, which resulted in a rich and positive collaboration with users. Adapting the phenomenon of Hedonic Adaptation results in an unusual setting with a tremendous level of motivation and energy [7]. Doing the unusual and shifting the standards in order to feel satisfaction [15] creates a positive sense of collaboration.

Moreover, everyone experiences the same kind of unusual daily routines during a pandemic. This created mutual understanding and positive cooperation among participants. It is valuable to respond to this when co-designing over a distance.

In addition, by starting a project in a period during which everything is different because of the pandemic, the designer does not know exactly how people will respond to the request for participants. Starting with a wide target group creates more opportunities.

In the end, the opportunity-focused mindset of the designer and participants is of great importance in taking the restrictions during the pandemic into account, and in setting up a remote context exploration and remote generative assignments, an ideation session or a remote prototype exploration. It is about not concentrating on what is impossible because of the restrictions, but focusing on the opportunities that are available.

The authors believe that the results of this project are relevant to designers (design researchers, interaction designers, service designers, product designers, architects) who want to include users and stakeholders in their processes, while being restricted to remote contact.

However, this paper also has its limitations. The findings are based on a single design project during the first lockdown period in the Netherlands. Further research with multiple case studies will provide more details on methodology for remote collaboration in co-design projects.

Another issue is that the world is changing fast. The context of the first lockdown (spring 2020) provided a unique shared setting in which the participants welcomed the chance to join a project like this in which they could reflect on the changes to the daily lives of their small family. We wonder if the project would have met with the same enthusiasm if it had been realised a year later (still in lockdown). For families, being stuck at home is no longer a novelty, and people are generally less happy with the situation. Referring to the phenomenon of Hedonic Adaptation, people are returning to the 'baseline' again [15]. People no longer see the change consciously after a longer period of time; they have become used to it [23]. We had a unique opportunity to tap into the moment of the first lockdown, which probably led to a lot of willingness to participate. We expect that the third principle of establishing an opportunistic and positive mindset is even more important in getting everyone fully engaged in another setting where remote co-design has to be executed.

5 Conclusion

This paper demonstrates that it *is* possible to conduct remote co-design when meeting physically in real life is no option. Though designers and users cannot meet in real life, iterative exchange of user insights and ideas can take place in alternative remote ways. Some of these ways can even enhance traditional approaches to involving users in co-design projects, such as deploying users as co-explorers, applying self-documentation techniques (vlogs, for example), and create frequent online contact moments between designers and users. To effectively apply these remote approaches, we suggest three principles: (1) Engaging users in the design process in the role of co-explorers. They have access to their everyday context, which the design team has not. Media such as video and photo and online video meetings were used to share and discuss what aspects are relevant in that context. A well-orchestrated and carefully articulated onboarding of participants is crucial in this regard. (2) Providing a sense of ownership of (intermediate) project results. When users are invited to collaborate in the majority of phases of a collaborative design project and given well-designed means (such as sensitising assignments and instructions for videos etc.) to be able to fully contribute, they feel ownership and are very willing to join a design team in all efforts. (3)

Establishing an opportunity-oriented mindset, by creating a positive tone of voice, appreciating everyone's effort, and many small loops of constant exchange and feedback on contributions make such processes pleasant and engaging to work on.

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