Exploring the Child’s Mind – Contextmapping Research with Children

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Abstract
User involvement in design processes is applied in progressively earlier phases. With contextmapping techniques, design researchers involve users even in the very first stage of identifying the everyday context of product use and assessing users’ needs, prior to defining product types or desirable product characteristics.

When applying contextmapping techniques with children, these techniques need adaptation to their understanding and skills. Lessons can be learned from related forms of children’s involvement in co-design processes. A few examples from sessions with children are given in this paper and experiences are combined into a tentative set of guidelines. It is suggested that the application of these techniques with children comes with some specific challenges and asks for further development, preferably in cooperation with the field of pedagogy, ethnography and child psychology. It is also suggested that results from these studies, when aggregated and made public, can provide designers of children’s products with a source of inspiration and empathy for their future users.

Keywords
Participatory design, design with children, contextmapping techniques

1. Introduction
The development of user involvement in product design has followed a reverse order, starting at the end of the design process and making its way back to the beginning. Traditional models of design processes describe the testing and evaluation of prototypes and nearly finished products by the end user. As a consequence of the high costs involved in making changes to the product at this stage of development, researchers have sought methods to test concepts before they were fully engineered. Mock-ups, aesthetic models and so-called wizard-of-Oz simulations are used to simulate product functioning in user trials, enabling designers to anticipate future usage (Rooden, 2001). At the same time, procedures to generate as much information in as natural conditions as possible have been developed (e.g. Kanis 1998, Van Kesteren et al., 2003).

These methods all have one practice in common: the designer comes up with the design ideas, users evaluate.

To give users a stronger voice in the development process, participatory design processes were introduced in industrial design. They had been in use for a longer time in architecture and city planning, where residents would build models of houses or residential quarters together with architects. In product design, these techniques have gained importance when digital technology with evermore powerful and complex functions became available for daily life. The challenge then became to make that technology subservient to users, that is: to develop functions and interactions that suited the users’ needs and were perceived to be fitting to the patterns of daily life. Participatory design can play an important role in this, as it gives end users a bigger voice throughout the design process.

In design with children, much experience has been gained in developing interactive technology based applications this way (e.g. Druin 1999a), Facer and Williamson 2004, Knudtzon et al., 2003). Druin (1999b) describes how the involvement of children has developed from users and testers to informants and finally design partners in the end of the 1990’s. The involvement of children should however not be overestimated: a survey of 105 scientific papers on children’s technology design between 1996 and 2004 showed that there still was a strong focus on evaluation of developed products. 95% of the papers did not report any findings related to understanding the needs and requirements of children in relation to use of new technologies (Jensen and Skov, 2005).

When children are involved as design partners, design methods need to suit them too. Studies are undertaken both to explore the division of roles between adults and children (e.g. Montemayor et al. 2000) and choosing and adapting design methods to children’s capacities (e.g. Sluis-Thiescheffer et al. 2007).

In these processes however, it is still the designer who on beforehand sets the objective, the topic and often also the product category to be developed. The methods do
not hold when a designer wants to take it yet one step further and get inspired by the user about the very area of product development, see figure 1. For insights in the themes that occupy the users’ minds, and the daily life that forms the context for a potential new product, contextmapping can be a suitable research technique.

2. Contextmapping

Contextmapping techniques can be described as a form of generative research with users, aiming at creating context awareness by eliciting emotional responses from participants, including users’ concerns, memories, feelings and experiences of these explored contexts (Sleeswijk Visser et. al., 2005). Examples are cultural probes and generative sessions. In such research, users are invited to report about themselves in unconventional ways and actively produce diverse artifacts that express their thoughts, feelings and ideas. At the core of this research are tasks and materials that help deeper reflection and diverse forms of expression: maps to indicate locations, notebooks to record thoughts, emoticon-stickers, drawings, photo-assignments, fantasy characters or scripts, what-if storylines to be completed, etc. The artifacts made by participants in generative sessions express and transfer meaning (Lindquist and Westerlund, 2004). Thus, the generative tools approach is a way to fill the fuzzy front end of design processes with the ideas, dreams and insights of the people who are to be served through design (Sanders, 2006). Figure 2 (by Sanders) visualizes how these techniques address deeper levels of knowledge than the sort that can be readily expressed.

According to Sleeswijk Visser et. al., a typical contextmapping research consists of:

- preparation (in which the researcher sets goals, develops the research set-up and creates stimulating tasks for the participants);
- sensitization (triggering the awareness of the user and stimulating conscious reflection about the subject of the research by giving little tasks to be executed in the home environment);
- sessions (generative exercises based on instructions and expressive components supplied by the researcher, which are then presented to the group and discussed and recorded);
- analysis (the rich set of collected data is processed and notions on the context of product use are derived);
- communication (the insights are transferred to the design team in ways that use the richness of the data to enhance the design team’s understanding of and empathy with users);
- use (the insights are used as tools for inspiration, evaluation of concepts, argumentation of choices).

Through this process, users are able to dig deeper than their explicit knowledge into latent knowledge, feelings and dreams they may not be aware of or find hard to express.

3. Participation of children in contextmapping

Contextmapping research overall is an emerging field, and contextmapping with children even more so. In recent years, some researchers have written about the application of generative techniques with children in design projects (e.g. Bekker et. al., 2002, Knudtzon et. al., 2003, Wyeth and Diercke, 2006), mostly about experiences gained in practice or in applied research. Typically, such publications describe the techniques used and present the benefits and drawbacks of these techniques and suggest broader applicability of these experiences. In this way, they add to the knowledge of this working field.
Not all these experiences, however, may hold true if applied to contextmapping that is aimed at the very first phase of design. In this phase the goal is to identify the themes that occupy children’s minds and document their daily lives. It precedes the stage of actual problem definition, let alone choice of product category. This goal has consequences for the research set-up, for instance on how the sessions can be facilitated but not overly influenced by the stimuli used, and on how children can be motivated when the overall research theme is abstract or vague. In an effort to explore the methods for contextmapping with children, some sessions have been executed by staff and students from Delft University of Technology. Though of an exploratory nature, some experiences and insights gained are thought to be worth sharing and described hereafter, followed by a set of guidelines, derived from these experiences.

4. The session on fears

Students from TU Delft carried out a contextmapping study with children on the theme of ‘fears’ (Sosinowska et.al., 2007). No aim for application of the results had been defined, other than getting insights in a part of the children’s world of experience. Divided over two rounds, 13 children participated. The children (aged 8 to 11) were invited to express their fears, what protected them from fears, places they associated with fears etc. They made drawings in a sensitization booklet at home, then came together in a generative session in which they located fearful places on a map of their personal environment, filled out timelines (simple scenarios) of what happened at those fearful places, and wrote letters to the principal persons or entity of those scenarios. All the materials that the children produced, were collected after completion and they were asked for explanations. But also all conversation during the session was recorded. It was found that this informal communication provided relevant insights, for instance about the perceived reality of some fears and the down-to-earth logical way to think about them:

A: I watched television and they had an interview with somebody who had seen a ghost.
B: With pictures, they had made pictures but I don’t think that it is like that. You cannot see spirits!
C: But it is quite scary anyway.
B: You cannot see them.
A: Spirits exist and you can see them!
B: Unless it is a ghost, then you can.
C: A spirit is inside a body and when you die, that is when it becomes a spirit.

The conversations proved even more essential when the children at the age of 10-11 did not want to put down on paper the more serious fears. There was no problem with reporting about spiders or traffic accidents, but when it came to, for instance, the fear that a mother runs away from home, the child was reluctant to put it on paper and hand it in to the researchers. Thus, the essence of the research was not captured in the artifacts, nor in their explanations, but working on the artifacts created the right setting for informal talks that did prove informative. Remarkable was the matter-of-fact treatment by the children of such emotional experiences, as is illustrated by the following example:

Child: I am always afraid that my mother will run away because she has done that before.

Researcher: Did she really leave?
C: Yes.
R: For how long was she gone?
C: But I fetched her back.
(…)
I went and walked behind her.
R: So what did your father do then?
C: He went on folding the newspaper.
R: Oh really?
C: En there was also a small dog that followed us.

It is only through direct interaction with the children that the researcher can capture these moments and prolong the attention of the child to it. But opinions on conversation in contextmapping diverge. The more strict conception of cultural probing promotes the handing in of artifacts made by the user without further explanation (Gaver, 2004). Others recognize the value of discussion in generative sessions, but warn against dominance of a single group member (Sleeswijk Visser et. al., 2005). In general co-design with children, it is advised to select child members for design teams that are talkative and confident (Knudtzon et.al., 2003). But when the aim is to get insight in the children’s world of experience, this pre-selection of certain types of children may cause blind spots.

The challenge for contextmapping sessions on sensitive themes then becomes to create an atmosphere where children, preferably not only the talkative ones, do express themselves and do so in recordable ways.

In this research, a maximum of six children per session was found to be workable. Two researchers worked as ‘creative partners’, each with a group of three children,
while a third one was introduced as the formal session leader, hosting the session and making recordings. By this division of roles, it was stimulated that the children would feel more at ease with the adult ‘creative partners’ and engage in informal cooperation with them. This worked out well.

Some of the children in the sessions knew each other from class. This too contributed to the results, as children sometimes brought up for discussion topics they knew of each other.

Another element that proved useful in the generative sessions on fears, is that all tasks did use the outcome of the earlier phase and focused onto it in more detail. This way, children were invited to ‘zoom in’ and also express themselves in more detail about this sensitive and emotional (and thereby possibly awkward) subject, without having to ‘dive in’ fully at once; they were guided from the level of conscious knowledge to the level of latent knowledge and emotions.

This approach deviates from the general advice when doing co-design sessions with children. As children are bound to withdraw from exercises that do not appeal to them, it is often advised to allow possibilities for them to step out and back in.

Finally, the practice to give children a hold on what is expected from them by giving tasks that hold one recognizable assignment about one single topic, may hold true in co-design in general but causes problems when applied to the very first stage of exploration, that is by nature somewhat vague and undirected. To compensate for this, all assignments were kept relatively short (up to 20 minutes each). With the child’s own end result of the previous exercise as the input for the next, it generally was not a problem to keep the children involved.

5. The session on outdoor play

A student from TU Delft carried out a session on outdoor play as a part of a project aimed at fighting excessive sedentary behaviour in children. The subject of the study was to identify aspects of play that children themselves identified as valuable. This was compared with what parents thought about their children’s play and then discussed. Nine children aged 5 to 9 participated (4 boys and 5 girls), and two researchers.

Working with this group asked a lot of flexibility from the research set-up. The interest in the different assignments and the treatment of the stimulus materials varied greatly.

In one assignment, it was tried to let the children create a character, which they could use in later assignments as the main character in storylines about playing outdoors. In this way, it was hoped to offer the children an opportunity to think more freely about play then when they could think only of their own daily context with possible practical limitations to play. The children were provided with an assortment of pictures of various body parts, from which they could make a character collage.

Two striking differences between the boys and the girls were observed:

- the boys completed the task as quickly as possible, while the girls insisted on having more time to elaborate on and color the characters;
- the boys used as many different and expressive body parts as possible and created lavish monsters, while the girls created realistic adult female human figures, see figures 3 and 4.

Fig. 3 Boy character.

Fig. 4 Girl character.
Though telling in itself, this also posed some difficulties for the research. The boys got impatient with the girls and the session became disorganized. Later, the girls’ characters did not lend themselves very much for envisioning various sorts of outdoor play. This hampered the zooming-in set-up of the session.

In another assignment, children evaluated outdoor activities depicted in drawings by putting stickers on them with various facial expressions. When evaluating some of these with children and parents, it appeared that children had sometimes put sad or angry faces next to activities they liked, to express their discontent that the children in the drawings could do the activity and the child itself could not. It shows how important it is to include the children in the interpretation of the materials and possibly in the production of the stimuli.

In one case, a child had labeled the activity ‘cycling’ with a fearful face, see figure 5. The parent told hat the child actually liked cycling very much. When she saw that the picture depicting the activity showed speed marks indicating ‘cycling at high speed, she understood that it was the child’s fear of velocity that had triggered his judgment.

Fig. 5 Examples of outdoor activities. Right picture: cycling – at high speed.

These examples show how easily ambiguity in the interpretation of stimulus material can lead to false conclusions. Yet, stimuli material by the nature of its purpose needs to be rich in information. In this case, double-checking with parents clarified some issues and proved to be of additional value to the discussion of the materials with the participating children.

In some cases, including parents can be the only way to use contextmapping techniques, for instance when children are too young to understand the questions raised or unable to express themselves due to a handicap. Van Rijn and Stappers (2007) describe the LINKX project, in which a language-learning toy for children with autism was developed. The involved children could not participate in conversations. Therefore, their parents and caregivers were involved (through contextmapping techniques) to gain insight into the experiential world of children with autism (van Rijn and Stappers, 2007). Adults are able to memorize, reflect, and formulate the experiences of the children. Additional information could be obtained from the children later, by observing their reactions to early prototypes.

6. The session on water play

Hosted by MIT’s ToyLab in Cambridge, a student of TU Delft conducted a series of co-design sessions on water play with two groups of 7 and 11 children, aged 11-13. The first session, which is described here, was focused on getting an insight in the daily life of the children and in the associations they had with water play and with communication as form of play. The session was preceded by a sensitizing package of seven short assignments to do in the weeks before the session, containing a diary with questions and drawing exercises, a camera to document their home environment and some collage material. In the session, a group discussion was followed by a generative session in which collage-making and drawing were combined with a brainstorm.

The pre-adolescents in this session were very conscious of their peers’ opinions about them and were reluctant to express anything that what was thought to be conflicting with the group norm. It appeared to be hard to motivate them to work with the sensitizing package, as many assignments were considered childish or irrelevant. The one assignment that was taken very seriously, was the photo-documentation of their home surroundings. Children thought it contributed to their image and found it important that their peers got the right impression of it. This is in line with findings by Postma (2005) with adolescents aged 13 to 16.

During the session, an important role of the session leader was to break the ice when children were reluctant or took the assignments as a test that you could either pass or fail. The children were reassured that every contribution was welcomed and in their creative work they were assisted by the session leader, operating like a facilitator.

Especially boys showed hesitation in speaking freely when girls were also involved in the session. When working together in the brainstorm, however, boys tended to work on the ideas whereas girls often took the role of writing down and organizing results. Girls were also more serious in presenting results to other groups, whereas boys started to ‘show off’. It is unsure to what extent this was influenced by the fact that the researcher was female; it is however known that in mixed gender interviews boys try to assert themselves in relation to girls by being ‘naughty’ or through the threat of this (Pattman and Kehily, 2004).

These examples show how different the preparation of a contextmapping session for this age group is, compared
to younger children. Creative activity in itself is not motivating for them, social reserve needs to be overcome, and the impact of gender issues seems to be much greater. Tasks have to be prepared with an eye on how the relevance of the question is communicated to the participants. Self-image and social image are perceived as very relevant and this can be used as a starting point. The behavior of the session leaders has to be directed at creating an atmosphere of trust.

7. Guidelines and questions to explore
Experiences from other researchers in the field of co-design with children have helped us in the set-up of sessions like the ones mentioned above, and from sessions like these it is tried to derive guidelines for contextmapping research with children. A tentative list of rules of thumb is presented here. All of these are open for discussion, supplementation and refinement:

1. Start easy. Many children are conditioned that when adults ask them questions, they are testing knowledge or skills, especially in a school setting. Make sure everyone can and does participate and everyone understands that honest expression is valued: there is no wrong or right answer.

2. Reward all children for being helpful. Give compliments and show your appreciation, also for small gifts.

3. Work in small groups. Make sure the team can give individual attention to each child. Our best results were with one session leader to structure the session, and two or three groups of three children, each with a facilitator functioning as ‘creative partner’ while stimulating conversation.

4. Give opportunities to be creative. Though this may seem obvious, there is always a risk that sessions and assignments are perceived by a participant as a blanks exercise. Session leaders may force their idea on how an assignment has to be done upon participants. This sort of research asks for flexibility and improvisation, also from the side of the researcher.

5. Talk with participants while they are creating. This is the time when they are focusing on the theme, and informal conversation at this time may yield results that they might be reluctant to express in public or in formal evaluation.

6. Present and discuss results. This helps to discern meaningful from unintended results and clarify ambiguity.

7. Take away the competitive spirit. Participants should feel at ease to perform at their own level. (In some cases however, where participants are reluctant, some competitive spirit may fulfill a useful role. This notion has yet to be explored).

8. Do several quick assignments instead of one longer one. A variety in the assignments keeps participants interested and makes the outcomes more diverse. Addressing a variety of skills in the assignments enlarges the chances all participants will find some exercises fitting to their capacities for expression.

9. Zoom in. Go from general assignments to more focused ones. In this way the research can explore topics without naming them, and later focus fully on them.

10. Do not pre-select participants. Excluding children from a session may prevent the researcher from getting unexpected results. Instead of pre-selecting ones that are communicative and easy-going, think of ways to cater for shy or unresponsive children, like making the results anonymous or working with representatives (characters in story-lines). There are many differences between children. Some may be more easily recognizable than others. Pre-selecting will prevent you from challenging your preconceptions about children.

11. Think not only of the type of answers you want to get, but also of the type of results the participants would be interested in generating. Especially older children (pre-adolescents and adolescents) will not be automatically interested in creative exercises. Creating materials that document and enhance their self-image may be a motivating trigger for them.

12. Use informants who know the participants. Evaluating outcomes with peers, parents or teachers can put the conclusions in another perspective, adding to the richness of the information. Involve the children in this, so they know what is said about them and can react.

8. Relations to other research areas
The above examples give a hint of the sort of challenges we face when applying the contextmapping techniques for uncovering children’s world of experience. In the development of this working field, many experiences from related co-design practice must be re-evaluated in order to build the framework.

What would do this framework good, is if the experiences from applied design research would be more closely related to the field of pedagogy, child psychology and ethnography. These working fields can provide a more solid basis for the collected experiences from design research. Both sides could benefit from the experience, as in childhood research too, a modified ethnographic approach appears to be developing that puts the child subject at the centre of the research (Thomas and O’Kane, 2000). There is much to be learned from the work of researchers such as O’Kane (2000) on decision making with children, the dilemmas on shifting children’s roles within psychological research from subjects or objects to participants (Woodhead and Faulkner, 2000) or from the Mosaic approach (a multi-method process of verbal and visual
‘listening tools’ developed by Clark and Moss (explained in Greig et.al., 2007). Some useful chapters on working with different age groups can be found in ‘Doing research with children and young people’, edited by Fraser et.al. (2004).

Another area of relevant sources to look into are the techniques used within orthopedagogy to help children express themselves about subjects for which they lack the vocabulary. In orthopedagogy, this may be about traumatic experiences (think of anatomically correct puppets used in supposed child abuse cases). The principle of using personas as representatives of the future user is not new to design research; but in this field little is known about how these can best be shaped and applied to fit children’s expressive needs.

Another of such examples are ‘blob trees’; a series of drawings in which humanlike characters are depicted with distinct emotional expressions or in various social configurations (see figure 6). They are used to help children identify and express their feelings and social contexts, e.g. family life. (Wilson and Long, 2007). As this series of drawings is being expanded to various daily life situations, the applicability for contextmapping research also increases.

Fig. 6. Example of a blob tree © Pip Wilson & Ian Long

Also the involvement of youth marketing sciences could be beneficial, as this working field could provide unconventional ideas for effective communication with children.

9. The final aims: better research, more insight

Though, as stated before, some researchers have published about their experiences with contextmapping techniques such as cultural probes and generative techniques with children, most of these publications focus on procedural experiences. This seems appropriate, as the research area is emerging and the type of research by its explorative and generative nature is hard to fit in formal guidelines. Researchers who report their experiences, help build the framework for this research.

Many researchers do not or very briefly report on the outcomes of the research: the contextual issues that they were after. In fact, this very paper is no exception to that. It is in line with the before mentioned findings in the field of children’s technology design, where only 5% of the publications on applied research over the period 1996-2004 reported on understanding the needs and requirements of children as a research purpose (Jensen and Skov, 2005). It may occur to the authors of papers in this field that procedural experiences have a wider applicability, whereas the contents of the research are only of use to the design team of their own project. But if a research can offer a design team empathy with children, we must consider the possibility that it can also inspire other designers (who may be focused on other themes) and broaden their insights about children. In fact, many of the students of the course “design for children’s play” at TU Delft claim that direct contact with children did not help them to answer their specific questions, but helped them empathizing with children in general. This statement is endorsed by Wyeth and Diercke when they write that in their cultural probing study with children, findings were of a general nature rather than providing specific solutions (Wyeth and Diercke, 2006).

Given the possibility to use results of contextmapping studies for gaining broader understanding and empathizing, it would be worthwhile to publish results of these research projects more elaborately, rather than only experiences on methodological issues.

Scientific papers may not be the best medium for that purpose. The question how to make these outcomes available in an accessible and inspiring way, while doing right to the research themes involved (and interests of the participants), is a research topic in its own right.

10. Conclusions

If contextmapping techniques are to be used for the exploration of children’s worlds of experience, prior to and independent of the area of product development, the existing framework for co-design with children, cultural probing and generative sessions need re-evaluation and adaptation. This paper identifies some issues involved
and explains some solutions tried in practice.

The further development of this framework could best be undertaken in cooperation with the sciences that have a long tradition of research on (communication with) children, such as pedagogy, child psychology and sociology and youth marketing, to give a more solid base to the framework.

The emphasis in publications on procedural and methodological issues has led away from reporting on the actual findings of applied research projects. It is suggested that these findings, when aggregated, offer the possibility to gain empathy with and understanding of children in a much broader spectrum than each individual study could yield. It is suggested that it would be worthwhile to research and develop ways to make such research outcomes better accessible to designers.

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