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Achieving empathy with users: the effects of different sources of information

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This paper describes a comparative study, which explores the influence of different sources of information on design sessions aiming for product concepts for children with autism. Six design teams were informed about children with autism under three conditions: A teams had only background information, B teams had background information and direct contact, and C teams had background information plus a video. Each team conducted a design session resulting in one product concept. These sessions were videotaped, transcribed and analysed for signs of empathy. The proposed product concepts were evaluated by parents and teachers of the children. Results show that the two B teams discussed the user group most intensively, and produced concepts that fitted the user group best. The two A teams made many false assumptions about the user group. One C team discussed the user group intensively and produced a product concept appreciated by caregivers, while the other C team did the opposite. The latter team was not motivated for the session. The results indicate that, and show examples of how, direct contact brings empathy with users to design teams and positively influences the quality of the product concepts they produce. Willingness and motivation of designers are key factors in empathic design.

Keywords: empathy; information sources; direct contact; ideation

1. Introduction

In user-centred design, there is a broad consensus that designers should be informed about the needs, emotions and experiences of their user group (e.g. Leonard and Rayport 1997, Fulton Suri 2003, Kouprie and Sleeswijk Visser 2009). Designers can obtain empathy with users in different ways, such as meeting prospective users themselves, evaluating prototypes with users, reading theories of experts or studying an observation video. Also in this issue, several authors describe different techniques to empathically inform designers about users (Ho *et al.* 2011, Mattelmäki *et al.* 2011, Glasemann and Kanstrup 2011).

Although many design researchers state their conviction that direct contact is a prime and irreplaceable source for obtaining empathy with users (e.g. Leonard and Rayport 1997, Mattelmäki and Battarbee 2002, Koskinen *et al.* 2003, van Rijn *et al.*

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2009), systematic or controlled comparison studies have not been reported. This paper aims to provide insight into the effects of different sources of information on designers' empathy with users and the quality of the product concepts they produce. This study is part of ongoing research on tools and techniques to support designers in learning from direct contact with users with cognitive impairments, and children with autism in particular (e.g. van Rijn *et al.* 2009).

2. Empathic design

In empathic design, designers attempt to get closer to the lives and experiences of users, aiming to increase the likelihood that products and services fit the users and enhance their lives (Koskinen *et al.* 2003). Fulton Suri (2003) understands empathy as 'our intuitive ability to identify with other people's inner states based upon observation of their outward expressions, their behavior'. In obtaining empathy with users, the designer's concern is to understand the user; to feels as if he is the user. Empathy is an individual ability, varying in strength over time and from one person to another. Next to ability, a designer's willingness and motivation to obtain empathy with users play a part (Kouprie and Sleeswijk Visser 2009). For example, a designer who has a personal connection with the user group or a strong commitment to the project is more willing to gain empathy with users. In the designers' process of empathising, relating to their own experience on the matter is an important step (Kouprie and Sleeswijk Visser 2009).

2.1. Empathic design techniques

Kouprie and Sleeswijk Visser (2009) report three main classes of techniques to enhance empathy in design. First, designers can obtain *empathy through direct contact* with users (e.g. observation, interviews, participation in their activities). The designers see through their own eyes the users' situation, condition, behaviours, feelings, emotions and needs. Second, designers can obtain *empathy through communication* mediated by user researchers. These researchers use special communication tools to convey the stories of users to the designers (e.g. personas, literature and videos). Third, designers can obtain *empathy through imagination*. The designer steps into parts of the users' experience by simulating the users' condition (e.g. performing role-playing, experience prototyping). In the present study, the first two techniques were used as sources of information for the design teams. The last one was left out, because simulating autism with such techniques is not easily done.

2.2. An empathic challenge: children with autism

The users in this study were children with a disorder in the spectrum of autism. Autism is an inborn developmental disorder that affects around 1 in 1000 of the population. Affected children may display a range of disabilities at many levels, such as impairment in social relationships, communication and imagination (Wing 1997). The official term is 'autism spectrum disorder'. The term 'spectrum disorder' indicates the great variety in ability, needs and preferences. In this paper, these children are referred to as 'children with autism' for short. Most of the children cannot read, write or speak language. For designers, this user group presents an empathic challenge: the needs and experiences of these children are radically different

from those if children with 'normal' development (van Rijn and Stappers 2008). Moreover, these children are not the only users; caregivers, such as parents, teachers and therapists, are part of the context of product use. With this extreme user group, signs of misunderstanding in the designers' discussions and the designs they produce are expected. Theory about autism is available, but much of it is rather theoretical and does not paint a rich picture of life as is deemed conducive to empathy. The comparative study in the next section explores different ways of supporting designers in learning about children with autism.

3. Comparative study: informing design teams under three conditions

This study explored how different sources of information influence design teams' empathy with users and quality of product concepts in design sessions. In a time-span of two weeks, six design teams developed product concepts for children with autism, in separate design sessions. The participants in each team were two or three international MSc design students from the Faculty of Industrial Design Engineering, Delft University of Technology, who voluntarily participated in the study. The one-hour design sessions took place at the Faculty of Industrial Design Engineering, Delft University of Technology. As preparation, the teams were informed about children with autism under three conditions. Teams A1 and A2 were informed under condition A: background information only. Teams B1 and B2 were informed under condition B: background information and direct contact. Teams C1 and C2 were informed under condition C: background information and video. The actual design session was similar in set-up for all teams. To determine the teams' level of empathy with children with autism, the teams' discourse during their design sessions was analysed (see Section 3.1). To evaluate the quality of the proposed concepts, caregivers of children with autism (three mothers, one speech therapist and one teacher) were asked to evaluate the teams' concepts. Caregivers, more than anyone, can provide expert judgements on how well a product concepts fit the experiential worlds of these children (see paragraph 3.2). Figure 1 depicts an overview of the study.
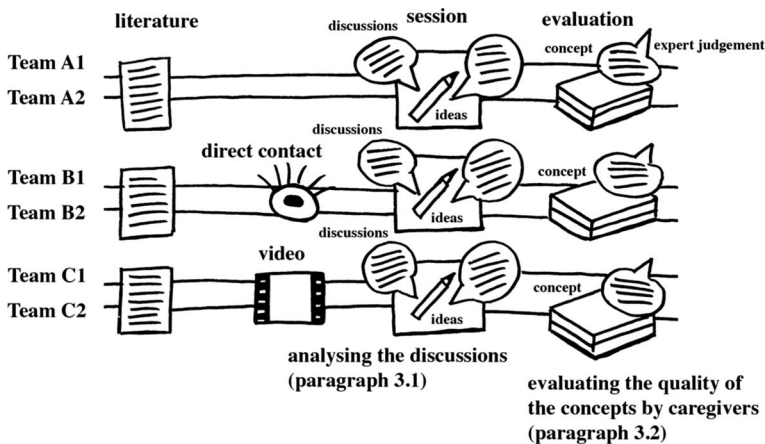

Figure 1. Structure of the study, showing teams, conditions and process.

It was expected that the B teams would obtain more empathy with the user group, and design product concepts that fitted the user group better than the A and C teams. It was also expected that the C teams would obtain more empathy and design better product concepts than the A teams, because video conveys more facets about the users' experiences than can be described in background information. For instance, an abstract notion such as 'the child with autism is easily distracted by sensory stimuli' gains empathic meaning when you can see what level of stimulation it was, how distracted the child was and how difficult it was to regain the child's attention.

3.1. *Evaluation of the design sessions*

For each condition (A, B and C), two design teams developed a product concept for children with autism in design sessions. The actual session was similar in set-up for each team. The discourse of participants during these sessions was analysed to determine the teams' level of empathy with children with autism.

3.1.1. *Procedure*

One week before each team's session, the facilitator emailed the participants individually to inform them that the user group was 'children with autism' and provide background information about autism. This background information was a four-page text document from the website of the UK National Autism Society (2009), containing an explanation and characteristics of autism, such as difficulty with social communication, social interaction and social imagination; it also described examples of these difficulties. The teams had not yet received their design assignment, to prevent them from thinking ahead about design solutions. They were instructed to use only information provided by the facilitator, to ensure that each participant was informed as planned.

Teams A1 and A2 were informed under condition A: background information only. They did not receive any extra information. Teams B1 and B2 were informed under condition B: background information and direct contact. Three days before their design session, they conducted a 30-minute observation of five children with autism at a special school. Team B1 observed the children in a language lesson. Team B2 observed the children during the activity of eating fruit. The two teams observed different activities for practical reasons; only one team could be present in the classroom at a time. During direct contact, they could observe the children and teacher, take notes and interact with the teachers (e.g. ask questions). On their way back to the university, each team could discuss the information retrieved from direct contact. Teams C1 and C2 were informed under condition C: background information and video. Three days before their design session, they watched the video of the 30-minute observation of a B team. Team C1 watched team B1's video of the language lesson. Team C2 watched team B2's video of eating fruit.

Each team developed a product concept for children with autism in a one-hour session (Figure 2). First, the facilitator instructed the team to design a lunch product for children with autism, fitting their needs and preferences (5 minutes). Then, in the discuss phase, the facilitator invited the team to start discussing their user data together (10 minutes). Next, in the brainstorm phase, the facilitator invited the team

Figure 2.   A design team in their session.

to start generating, selecting and elaborating ideas into a final concept (35 minutes). Finally, the facilitator invited the team to present their concept (10 minutes).

The sessions were videotaped and transcribed. In the transcripts of the sessions, the following signs of empathy were sought: empathic expression, relating to own experience, questioning user needs versus making assumptions, and discussing user facts. A designer expresses empathy if he or she literally says: 'I think/feel/guess the children think/feel/want ...'. Moreover, a designer is empathising when relating the children's needs and experiences on the matter to their own experiences or even comparing them with other children they know. Finally, when designers question the needs and experiences of the children compared to making (false) assumptions, they realise their lack of empathy. Although discussing facts about the users does not prove empathy, the time spent on this was taken as an indicator of empathy, because direct measurements of empathy are difficult (Kouprie and Sleeswijk Visser 2009).

3.1.2.   Results

The results show that the B teams discussed the user group most often, followed by C, then A teams. The A teams referred more to the background information, devoted more time to generating ideas, and produced more ideas than the B and C teams. Coincidentally, one of the three participants in team A2 had a far acquaintance who has a child with autism. Therefore, team A2's condition is, undesirably, somewhat similar to that of the B and C teams. However, the other two participants in that team did not have any experience of autism.

The A teams only discussed the user group in the discuss phase of the session. The background information played a minor role in the B and C teams' discussions. The B teams discussed the user group even in the brainstorm phase. The two C teams differed from each other. Team C1 hardly discussed the user group, while team C2 did, even in the brainstorm phase. Team C1 generated ideas most of the time, while team C2 did not. This section describes signs of empathy for each session. Figure 3 show graphs for each session, representing roughly how often the teams discussed the user group over time (based on counting explicit references in the transcripts by two of the researchers).
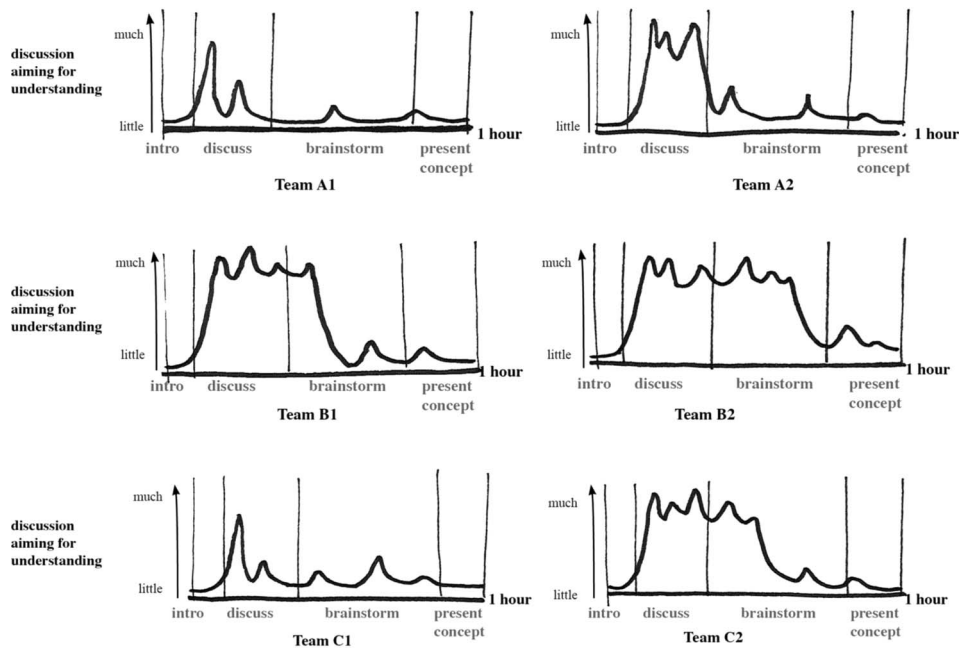
Figure 3. Visualisations of time spent on discussing users in the different phases of the sessions of the teams.

Team A1. None of the participants literally expressed empathy with the children. In the discuss phase, they briefly discussed user facts and started idea generation before the facilitator instructed them to do so. Although they questioned user needs, they made just as many false assumptions. For example, a participant had an idea: 'This timer helps them not to forget their lunch'. Even though a timer could be a good idea for these children, you would not use 'forgetting' as an argument if you had observed the structured day of these children. Although one participant related to their own experiences once in his assumption, this did not have a positive effect on empathy: 'The lunchbox is easy to understand for us, so it is easy to understand for them'.

Team A2. As mentioned earlier, one female participant in this team had a far acquaintance who had a son with autism. This 'informed participant' expressed empathy with him three times. For example, she said: 'He wants his potatoes and meat exactly on one position at his plate and only than he eats. Other people at the table are unpredictable; they can have water instead of milk and than he gets really stressed. I guess he wants to take away all the other things, so he hides'. None of the participants related to their own experience. They questioned user needs, but made as many false assumptions. The knowledge of the informed participant had a positive effect on discussing user facts. She answered questions and added real-life examples to the background information.

Team B1. During the session, participants expressed empathy twice. For example, a participant said: 'I think the question is if you're making this lunchbox to fit to their world or you're making this lunchbox trying to teach them how to fit in to the normal world?' This expression shows empathy; the participant knows how different

these children are from children with typical development. Together, they memorised their own experiences of using a lunchbox in their own childhood. Moreover, the participants discussed user facts and raised questions about the children's needs and experiences instead of making assumptions about it.

Team B2. One time during the session, a participant expressed empathy: 'If a child goes from some place to another, I think he always want the caregivers or parents around them'. None of the participants referred to their own experiences. They only discussed facts from the observation and did not mention the background information. During the brainstorm phase, they could not reach agreement on whether children or caregivers carry the lunchbox to school. They needed more information and did not want to make a possible false assumption.

Team C1. During the session, one participant expressed empathy once: 'The autistic people like having a routine, they want to know what they are going to do and they are going to do the same thing everyday. Then, they feel comfortable and secure'. A participant referred in her idea to her experience of children eating: 'Maybe some effect when they have eaten everything, since children always leave something on the plate'. However, this example shows how little the participant knows about the eating behaviour of the children. In the discuss phase, they shortly discussed user facts from the background document and started idea generation before the facilitator instructed them to do so. They did not refer to the children in the video. They struggled with idea generation; the facilitator said this team was not very motivated during their session.

Team C2. During the session, the participants expressed empathy three times. For example, one participant said about a boy in the observation video: 'If you have a ceramic plate and a metal knife, I could imagine that he is really sensitive to that sound'. They referred to their own experience once in making sense of their observations: 'The boy who was eating banana, couldn't say "banana". That is a thing an 8-year-old normally could'. They realised these children were different from children with typical development. They discussed the characteristics of each child and the teacher from the observation video and referred three times to the background information. They questioned the user group and did not make any false assumptions. They often referred to the activity of eating fruit in the video.

3.1.3. *Discussion of results*

The findings confirm the expectations about which conditions produce the most fruitful discussions about the users. In decreasing order, these were: (B) visiting them, (C) watching a video, and (A) reading background information. The B teams were actively learning about the user group and had a common ground for discussion. They gathered information with their team in the situation and could share and discuss observations during the 30-minute bus trip back home. Interestingly, the B and C teams considered caregivers as part of the context of product use, while the A teams did not mention caregivers at all.

The B and C teams hardly referred to the background information in their discussions. Observing the user group in a real situation or on video produced more empathy than merely reading background information. The A teams discussed the

children in general and started thinking about solutions early. They easily made (wrong) assumptions to start ideation. Apparently, they automatically filled in their knowledge gap to continue their session. The B teams, who met the children, did not easily make assumptions about the user group. They wanted to be certain and get the details right.

3.2.   *Evaluation of the concepts*

To assess which team produced the best fitting designs, five caregivers of children with autism, being three mothers, one speech therapist and one teacher, were asked to evaluate the six concepts on their suitability for the children. Caregivers are experienced with these children, and therefore can provide expert judgements on how well product concepts fit the experiential worlds of the user group. An independent illustrator made drawings of the six concepts to visually elaborate them all to the same level, preventing variation in drawing skills between the teams influencing the evaluation (Figure 4).

3.2.1.   *Procedure*

Caregivers evaluated the six product concepts by means of a questionnaire, in which for each concept they were instructed to study the drawing, the description and the argumentation of the design team. Next, they rated ('yes', 'a little', 'no') the degree to which the concept fitted the needs and preferences of children with autism, and motivated their choice. Finally, they chose one concept that fitted the user group best.

3.2.2.   *Results*

In general, the caregivers said that the concepts of the B teams fitted the user group better than those of the A and C teams. In fact, they said that the concepts of the A teams did not fit at all. The concepts of the C teams received mixed reviews. Each of these is discussed below. Figure 5 shows an overview of the caregivers' evaluation of the six concepts.

Team A1: A lunchbox with a help screen. The team had motivated their concept as: 'Our lunchbox is just a lunchbox, because children with autism want to feel the same as normal people'. The therapist reacted negatively to this statement: 'I don't think they feel the same as normal people. Moreover, a screen doesn't work, because they have difficulties doing two things at the same time, such as eating and watching TV'. The teacher also thought that this concept did not fit the children. One mother said that this concept fits her child a little: 'It's good for play, but would distract him from eating. Showing an example of how to play with a toy could be a good idea'. Another mother similarly pointed out that learning while eating is too distracting.

Team A2: Boxes in a lunchbox for clarity. Although one participant had prior experience of autism, both the therapist and teacher rated this concept negatively. The therapist explained: 'For most children, eating is impossible like this. Filling boxes is fun and educational, so it can be used for other activities than eating'. One mother said that this concept fits her child a little: 'I like the screen for private space;
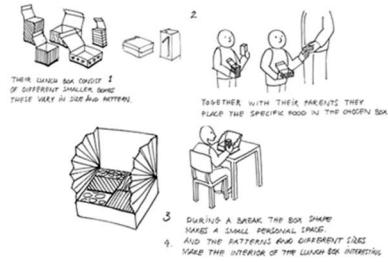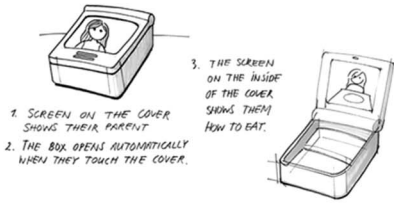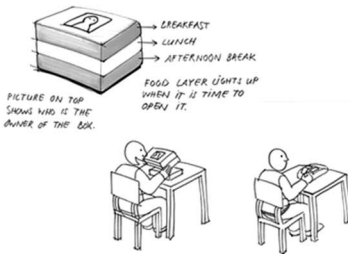
1: A lunchbox with a help screen (Team A1)

The lunchbox has a screen on both the inside and the outside, aiming to show the children how to eat.

2: Boxes in a lunchbox for clarity (Team A2)

The lunchbox can be filled with little boxes for each type of food to make rules between parent and child about the content.
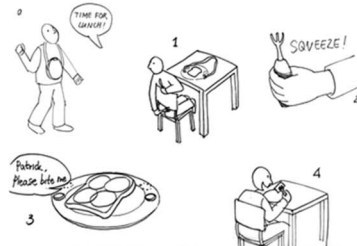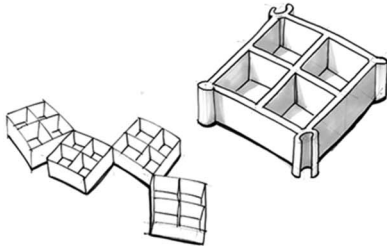
3: A layered lunchbox (Team B1)

The lunchbox has a separate layer for each snack moment. The top layer lights up when it is time to eat. After eating, the layer goes to the bottom.

4: Match to open the lunchbox (Team B2)

Children can open the lunchbox by matching the right icons to the icons on the box.

5: A social lunchbox (Team C1)

This lunchbox makes lunch a social activity. When all lunchboxes are linked, they change colour to indicate it is time to eat.

6: Attention to the food! (Team C2)

This lunchbox aims to help the children keep their attention on eating by reminding them each time they are distracted.

Figure 4. Drawings and descriptions of the six product concepts, used to evaluate with parents.

I can imagine they like this. But the boxes would distract my child. He will put them in a row without actually eating'. Another mother explained that this concept is too complicated: 'The boxes are too chaotic, but I like the screen for a quiet place'. One mother rated the concept positively: 'The screen is nice, and they can practise

Team A1
All caregivers said this does not fit the user group.

Team B1
All caregivers said this *fits the user group best.*

Team C1
This addresses the users' weaknesses. Some regard this as positive and others not.

Team A2
Two caregivers said this does not fit the user group, while three said parts of it fit a little.

Team B2
Three caregivers said this fits the user group, while two said it fits a little.

Team C2
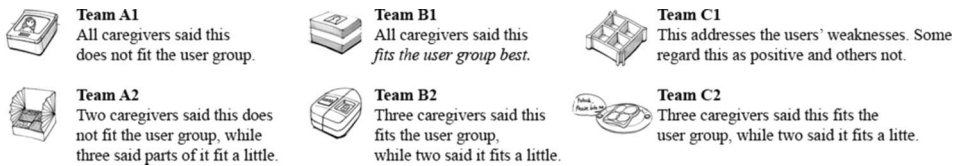Three caregivers said this fits the user group, while two said it fits a litte.

Figure 5. Summary of evaluation of the six concepts, showing that the concepts of the B teams fit best to the needs and experiences of the user group.

choosing'. The idea of the screen was rated positively; was the idea of the participant with prior experience of autism.

Team B1: A layered lunchbox. Unanimously, all caregivers chose this concept as the best fit with the user group. One mother explained: 'This lunchbox is most effective for eating lunch. It's important that a child can eat independently in an easy way. As a parent you can determine yourself how you can best use it for your child, because each child is different'. The therapist said: 'This lunchbox is very practical and well structured, visual and tactile. The lunchbox indicates the order and enlarges the independence of the children. In the morning, they can take out all their food at once, instead of one by one. This saves time and provides more independence'. The teacher agrees: 'Working downwards is a good idea, just as the pictograms on top of the box. I would match them with the ones on the plan-board'.

Team B2: Match to open the lunchbox. Three caregivers said that this concept fits the user group, while the other two caregivers said that it fits a little. The teacher thought that the idea was good: 'It is concrete and visual. Many children enjoy solving puzzles'. A mother agreed: 'It looks nice, and it is a little game to invite to lunch. It is important to change the pictograms regularly to keep the box interesting'. Another mother said: 'The lunchbox is challenging and elicits moments for language and asking for help'. However, the teacher did not agree: 'Many children experience soft material as unpleasant. This could have a negative effect on eating. Moreover, this lunchbox aims for children to learn, while eating itself can be challenging enough. Therefore, relaxation should be most important, not learning'. Finally, one mother rated the concept with 'a little': 'I would adjust the pictures to the content of the lunchbox. I would add for example the sound "enjoy your meal". So, they learn to say that'.

Team C1: A social lunchbox. Some caregivers disliked this idea, because the children would not understand and enjoy the social aspect. One mother said: 'Children with autism do not want to be social. They do not like others near their food'. According to the therapist and a mother, this concept showed some promising elements. The mother said: 'I like the separate compartments for food; this will work. Linking boxes won't. When my son is eating, I would never stimulate sharing, because he should feel safe. I do like the idea of a sound when it's time to eat. The teacher would set this time'. The therapist liked the idea of linking: 'Through linking the boxes, the children come close to each other. A sound to announce lunchtime can result in a lot of commotion'. One mother liked the concept, because it stimulates the children's weaknesses. She explained: 'The lunchbox seems technological, which interests the

technicians among the children. Linking supports the feeling of togetherness, although this can be frightening for the child. This should be introduced well. The sound can be both fun and disturbing'.

Team C2: Attention to the food!. Three caregivers rated this concept positively. For example, the therapist said: 'Indeed, we repetitively remind the children they are eating. The fork's lights might cause them to pinch their fork all the time. It would be great if lights turned on when they put something in their mouth. However, they might put too much in their mouth at a time. Some of my children already do this'. A mother said: 'I like the concept. I repetitively tell my son to take a bite. I like the fork, but it shouldn't be too much fun, because that distracts from eating. Pinching the fork with a light is nice, even though I wonder if the light stays off when that compartment is empty'. Another mother agreed: 'I like to give my child something to play with that causes lights or sound. Especially when he hears "eat this sandwich"'. Finally, the teacher and another mother said that the concept fits a little. The mother wrote: 'This would only fit children who are quickly distracted'.

3.2.3. Discussion of results

The results of the evaluations on the product concepts corresponded to what was expected regarding the helpfulness of the sources of information, in decreasing order: (B) visiting them, (C) watching a video, and (A) reading background information. The A teams made many wrong assumptions resulting in product concepts that do not fit the user group according to the caregivers, showing that they were not aware of the limitations of the user group. They used their own imagination, leading to extreme ideas, instead of being led by existing solutions for the user group, as in the B teams. The ideas of the B teams were related directly to their observations, such as the use of pictograms to structure the child's day. For example, one participant mentioned that the lunchbox should say the name of the food each time a child picks something out of it. He based this on the observation that the teacher kept repeating the word 'banana' when the boy ate his banana. The B teams discussed and detailed the product in such a way that it would fit the children they observed in the classroom. Teams B1 and C1 observed a language lesson, while team B2 and C2 observed the activity of eating fruit. Interestingly, these two different subjects had different effects on the session: generalising and particular, respectively. Observing the language lesson resulted in ideas about educational lunchboxes, while observing the children eating fruit resulted in ideas about lunchboxes that support eating. According to the caregivers, the product concepts of team B2 and C2 better fitted the user group than the concepts of team B1 and C1. They did not appreciate the educational lunchboxes that much, because they thought that eating is difficult enough already. The participants who observed the children eating fruit realised this. The (videos of) observations related to the design assignment helped the participants in understanding the context of product use and designing for this context accordingly.

4. General discussion

Because of the small scale of this study, the results can only give an indication of the effects of different sources of information on designers' empathy with users and on

the quality of the product concepts they produce. These results show that direct contact brings the most inspiring and lively discussion about the user group within the design teams and leads to product concepts fitting the user group's needs and preferences. Merely viewing the observations on video was not enough. Therefore, it is proposed that designers should make an effort to meet real users at least once. Of course, designers should not solely learn from direct contact with users, because they would miss out on the admirable body of theory on autism available in the scientific literature and other sources of information, such as the internet, documentaries and books. The strength lies in integrating different sources of information. Personal experience from direct contact helps designers to understand the theory on autism and vice versa. Designers should integrate different sources of information to reach a level of empathy with this user group.

Although many researchers state that direct contact with users is valuable for designers (e.g. Leonard and Rayport 1997, Koskinen *et al.* 2003, van Rijn *et al.* 2009), in practice it is sometimes impossible because of limited budget and time. The results indicate that video shows potential for designers in gaining empathy with users, as long as these designers are willing and motivated to learn about their users. In direct contact, designers are actively involved in data collection, whereas in watching a video, designers can choose to take on an active or more passive role. This was clearly visible in the two C teams. Team C1 was less motivated than team C2. This lack of motivation in team C1 might be due to the fact that the children were not very active in the video of the language lesson. Moreover, the camera was pointed at the teacher, who taught the children the difference between 'warm' and 'cold'. The design team could not clearly see the children's reactions to this lesson. In contrast, the video of team C2 showed the children in their activity of eating fruit. In this activity the children were active. To motivate designers in learning from video, the users must be clearly visible in their actions and reactions. Another explanation could be that the activity of eating fruit was related to eating lunch, and the language lesson was not. It seems plausible that designers are more motivated when the information they receive is related to their design assignment. Next to these two pieces of advice, guidance in watching the video may increase the team's motivation. Although no guidance was given in this study, providing an assignment or specific topics to pay attention to while watching can initiate a discussion about these topics among team members.

However, not only in the two C teams did willingness to empathise with users differ; this willingness appeared to differ for the three conditions. Differences in atmosphere and the attitudes of the participants were noticed between the six different sessions. The B teams were visibly more motivated during the session than the A teams. Apparently, observations at the school made the participants function better as a team. The participants in the B teams had a shared experience: they observed the same activity, in the same room, with the same children. Moreover, in practice, designers who arranged direct contact with users would already be willing to learn, because they have taken the time and made the effort to learn about their users.

5. Conclusions

This paper described the findings of a study that explored how the way of informing a design team influences their understanding of a user group and the quality of

product concepts that they produce. Compared to informing designers by video or background information, direct contact with users brought most empathy and led to product concepts fitting the users' needs and preferences best. Video could also bring empathy to design, as long as designers were willing and motivated to learn about users. This willingness and motivation appear to be key factors for empathy, automatically stimulated by direct contact.

Further research explores the role of direct contact in a design process, and how this contact can be effectively brought to understanding and used in a design project (e.g. van Rijn *et al.* 2009).

Acknowledgements

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