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A case study of intuition and design:

Building a tool for parents of premature babies and the nursing staff
who care for them

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Abstract

The paper presents a research-based study project conveyed by Media Lab Helsinki in 2007–2008. During the process, the design team constructed a unique audiovisual tool that provides emotional support in coping with the challenges of a premature birth. The purpose of the two-hour DVD, with its three separate parts, is to help family, intensive care staff, and other associated health care personnel to better connect with each other and the tiny babies. As the first audiovisual material, which aims to explain premature babies' communication and interaction, the end product has proven to be of significant value to Finnish neonatal care and other associated fields. The project was realized in cooperation with the Neonatal Intensive Care Unit in Children's Hospital, HUCH (Helsinki University Central Hospital), and the design team worked in a network of shared expertise.

In the case study the authors used co-design and self-reflection methods to monitor graduate students working with a society-level challenge. The focus was upon the utilisation of intuition in innovations, problem solving, and project management. During the design process, the authors observed the working theory: intuition is the basis of successful decision-making, which leads to innovative solutions. Throughout the design process, the team collected systematically feedback, which was later utilised as a corner stone in the case study.

The authors believe that relying on intuition, the design team ended up addressing many hidden issues of the clinic and parenthood of premature babies'. This paper tries to unfold the evolutionary working approach used during the design process, presents highlights of the case study research as well as illuminates the intuitive way of working from designers' point of view.

Keywords

Design; Intuition; Case Study; Shared Expertise; Innovations; Digital Media; Evolutionary Process

Background of the project

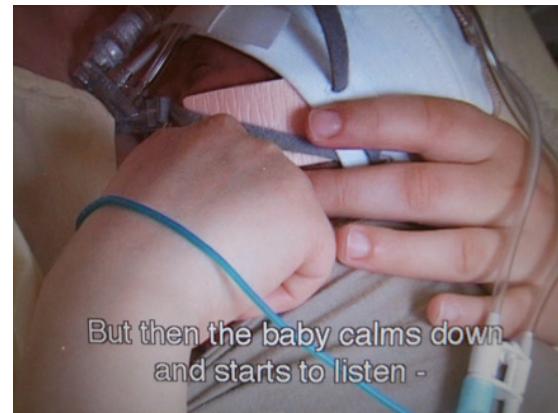
This case study presents a research-based study project created by MA in New Media students. As a result of the design process, an audiovisual tool in a DVD format, called *A Different Journey* was published as well as two Master theses were produced. The project was realized with the Neonatal Intensive Care Unit (NICU) in Children's Hospital, HUCH, where 150 premature babies

were treated during year 2005. Fifty of them weighed less than 1000 g. In Finland more than 500 babies are born prematurely every year. In this case study, fifteen preemies, observed and filmed were born during pregnancy weeks 23–27 and weighed under 1500 g.

The audiovisual tool focuses on helping to understand the world of a premature birth by combining learning material as well as a touching description of the emotional journey of affected families. By combining art, science and digital media, the students were able to invent innovative solutions to the discovered problems. The communication of premature babies differs from that of full term babies', since their nerve system is very premature. It is a hard-to-decipher and a unique form of communication, which needs to be studied and understood in order to help the child.

The design team consisted of nine designers: a pre-production designer, a director, a camera-man, an editor, a creative producer, a visual designer, a sound designer, a DVD designer, and a project manager. For all of them this was the first time in a large audiovisual production. Due to a lack of specific technical expertise to carry out an audiovisual production of professional quality, the team had to learn many abilities and invent various solutions on the way. The designers had to work at the edge of their expertise. In such circumstances, they had to rely upon insights and weak signals. This created an optimal circumstance to observe the use of intuition. During the process the design team was working based on shared expertise with a wide network of various specialists: doctors, nurses, parents, therapists, a hospital priest, social worker, and other professionals such as technical experts in the area of digital design. Four experts from NICU worked closely with the designers throughout the design process.

In the NICU, there is a growing focus on the deeper, psychological concerns of the crisis. In order to truly help the entire family, the staff's mission now includes easing the parental psychological barriers in getting attached to a baby that might die. Bringing parents to interact more with their prematurely born baby will advance the emotional birth of a state of parenthood and, in turn, tremendously help the development of the child. Closeness of the parent can even bring about positive physiological changes. For example, in 'kangaroo' treatment, the baby is held under the shirt of a parent, on bare skin. During the treatment, some parents reported that the baby did not need any extra oxygen. Because of its positive effects, the primary goal defined by the hospital staff was to strengthen the bond between parents and their preemies through the video.



Pictures 1. & 2. Bringing parents to interact more with their preemie will tremendously help the development of the child.

The design brief defined by the hospital was to make a 20-minute video about the specific nature of premature babies' communication. This was to be used initially as an informative training material for parents and staff. The design goal was then redefined, and the design team created an audiovisual tool containing 118 minutes of material. It was divided into three separate sections, each having a different function, and produced under the Creative Commons licence. The non-commercial DVD has now been used for three months also among other professional and educational institutions specialized in parenthood, therapies, childbirth, and children's early development.

Theoretical background

Design is usually defined as one of the most challenging cognitive tasks, since it always demands the highest level of problem solving skills (Goel 1995; Simon 1969). Digital media design is strongly based on problem solving with an emphasis on inventing communal solutions that support future socio-techno-cultural processes. Designers are expected to create original and unexpected outcomes and through design they formulate solutions to challenging problems and even have a responsibility to design the future (Nelson & Stolterman, 2003).

Creativity can be defined as producing previously unforeseen solutions that are incorporated into larger society (Csikszentmihalyi, 1996; Gardner, 1993). It often involves exploring new ways of dealing with things and exploiting or adapting known approaches in new contexts. More specifically then, creativity appears to require a conscious effort to cross boundaries between individual know-how and visions as well as social knowledge and communities of practice (Csikszentmihalyi, 1996; Boden, 1994).

Design processes are usually examined through iterative and cyclic process models; distributed cognition and shared expertise (Lawson, 1997; Bereiter & Scardamalia, 1993; Goel & Pirolli, 1992). In this case study, the authors found great advantage also from management theories, especially theories of evolutionary developing processes, which helped to understand the structure of the design process. Linear or deterministic processes aim to proceed along predefined plans, calculations, and schedule with specified goals, while non-linear or so-called evolutionary processes are constantly developing, and goals often change during the process (Sahlin-Andersson & Söderholm, 2006).

Intuition is considered to be an insightful solution for a problem that pops, seemingly unhidden, into consciousness. The meaning of creativity can be described as an analytical secondary process verification motivated by, and based on, the intuition (Bastick, 2003). Intuition is connected with preverbal and preconscious processes as well as emotions (Bastick, 2003; Norman, 2005). Along our understanding tacit knowledge, weak signals, and insights work as components, which can be utilised by intuition. Weak signals are trends, ideas or warnings that affect our living environment but that are difficult to identify or too incomplete in order to determine their actual effect (Day & Schoemaker, 2006). However, once weak signals are recognized, a host of other signals become clearer or more apparent.

In this design challenge of multiple possibilities beyond understanding, the power of creativity and intuition was essential to the designers. For the authors who also worked as designers in the team, intuition was not only a valid tool – it turned out to be the foremost tool in the design problem. Policastro (1999), Norman (1993), and Boden (1994 & 1992) have stated that intuition helps the individual to shift through the endless possibilities of idea development by setting preliminary boundaries for exploration. Mathematician Henri Poincaré has stressed that with logic we prove, but with intuition we discover (Bastick, 2003). The authors believe that discoveries form the most essential component in intuitive processes. Furthermore, we agree with the definition used in the tradition of philosophy, where intuition is considered to be the highest form of intelligence in the area of strategic thinking and decision-making (Henden, 2004).

One of the most relevant questions in this case study was the validity of intuition as an important aspect of a model for design research. How to e.g. separate intuition from other feelings like wishful thinking or fears? Author 1 has been using a self-reflection model (Figure 1.), which presents three parameters, through which interpersonal dialogue can help designer to utilize intuition.

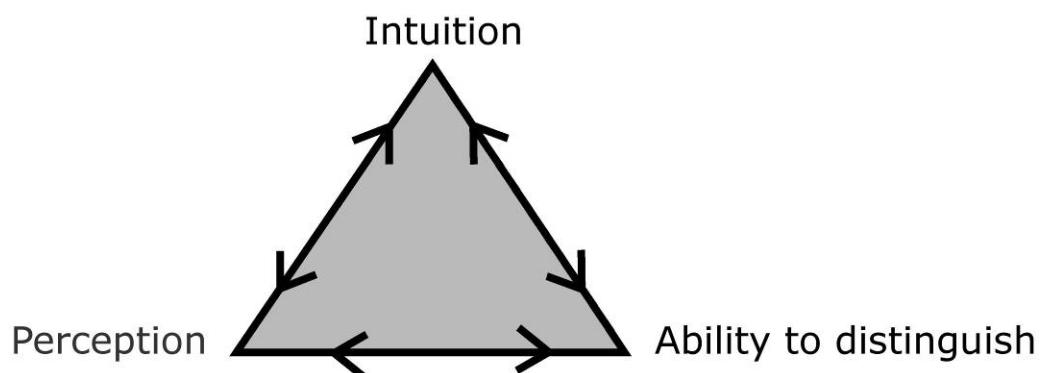


Figure 1. Interpersonal dialogue between components supporting the use of intuition (Raami & Rouhiainen, 2006)

When a designer gets an intuitive idea, the character of it can be evaluated through perceptions, such as emotions or other form of weak signals. If perceptions include emotions like fear or strong wishes, intuition needs to be observed further. To evaluate the importance of these perceptions, ability to distinguish is required. Designer needs to recognise the perceptions of

significant value, e.g. the weak signals that are relevant. Through this dialogue, designer is able to evaluate also the quality of intuition and to tune his or her intuition into more sensitive direction. Through intuition, the designer can become aware of new perceptions and distinguish even weaker signals.

Furthermore, a possible design solution can be evaluated through these three components: information gained through intuition and perceptions, as well as the significance and quality of them. This dialogue is closely connected with development of expertise. Professional expertise supports recognition of meaningful observations as well as helps to invent valid possible solutions (Bastick, 2003; Lawson, 1997; Bereiter & Scardamalia, 1993; Norman, 2005). As a conclusion, the quality of intuition can be evaluated through perceptions and the significance of them, as well as these two other components can feed intuition.

Research questions and methods used

In the beginning of the project, the authors started to observe the case from three different angles due to their personal interests and different roles in the project: How to find the core of the design problem and a specific solution to it; how to handle and manage a real-life evolutionary project; and how to encourage students to utilize their intuitive knowledge when working in a real life study project. During the process, all the different angles fused into one working theory: intuition forms the basis for successful decision-making, which led to innovative solutions. This paper will focus on this statement.

The methodologies used were co-design, self-reflection, observation, and discussions. Throughout the process the design team had constant discussions where ideas, gut-feelings and preliminary solutions were thought over. The team also organized 12 test showings and used systematically collected feedback as an evaluation tool for their design solutions. Through this feedback the authors found out that the most successful design solutions had been made strongly based on intuition. As mentioned above, one of the most interesting questions for the authors was the validity of intuition. Feedback was considered to be crucial also due to the specific nature of the subject: the design team did not have any professional expertise in the area of prematurity. Among the audience were a varying number of psychotherapists, nurses, doctors, social workers, priests, physiotherapists, preemie's parents, and professionals of audiovisual productions. Each aspect was discussed over many times and also written anonymous feedback was collected often.

After publishing the DVD, the feedback was gathered systematically through the Internet. Each DVD included a request for feedback. This proved to be a good way to gather feedback from multiple perspectives. There have been comments from ex-preemies (nowadays teens), from mothers having a preemie 3–17 years earlier, and from teachers, just to mention some. In total twenty-four persons have been used as informants in the case study. The authors also joined a private movie evening organized by the association of premature babies' parents to get direct feedback from mothers. With the help of a mother, feedback was also gathered from a closed discussion forum accessible only for preemies' parents. Furthermore, nursing staff in the hospital collected the feedback given at the NICU or through their networks.

Tuning into intuitive ways of working

Unexpected design constraints

The team had a detailed production plan to start with. However, the designers discovered it was based on a vague problem definition and an idealistic working method. At NICU, hardly any filming can be planned in advance. Where ordinary audiovisual productions operate with pre-planned script in a fixed management schedule, the team had to allow maximum flexibility. The director, the creative producer, and the camera-man have described this challenging, due to the fact that the models used in the field of digital design are mostly based on traditional filmmaking (Kriwaczek, 1997).

Despite the fact that the team had to work without a script and a detailed schedule, there was a certain tendency towards determinism. It is interesting that whilst the team felt the iterative and evolutionary process was a better fit for the design process, at the same time they stressed the chaos in the content and worry about its constant 'self-organising'. The cameraman asked for the story boards several times and the director and the creative producer even produced some, until story boards turned out to be impossible to follow. Everything had to happen in the terms of the emergency nature of the hospital. During the process we understood that completing a project was not a task of execution, instead it was a journey of knowledge creation (Sahlin-Andersson & Söderholm, 2006).

During the editing phase of material the design team had to constantly bear in mind the issues of ethics and privacy. Although it was on our agenda to film the smallest babies, only one happened to be born before pregnancy week 25. Afterwards the baby passed away and the team was unsure if the material could be used. Also, almost in every interview session, it was difficult to get parents to relax in the front of the camera in the beginning, so that they would tell about their inner feelings and thoughts. Through sensitive personal approach, the director was able to create a trustful atmosphere. After they relaxed to talk, especially mothers tended to be even too open and told many personal and intimate issues.

Personal insights guiding the way

During the design process intuition was used several times, but here we will describe just one example in a more detailed level due to its importance to the whole project. During parents' interviews carried out by the director, a major issue was revealed. In our society all the stories told are about having full term babies. In these stories premature baby's parents become drop-outs, and they find themselves in a narrative vacuum. Before being able to handle issues dealing with the communication, which was the design brief, parents needed help to encounter their child through feelings of fear of death and guilt. The director understood that the information of a great interest to the nurses did not really meet the parents' needs. What was thought to be the parents' problem was actually that of the nursing staff. The parents had such huge issues in their life at the time of being at the NICU that it was hard for them to concentrate on what the baby was trying to tell them. They did not primarily interest themselves what it meant if their baby did this or that, they wanted to see something that would make sense of this crisis. They needed

understanding, not mere fact based information. What they actually needed was something, which would help them to look at the small children as their children, with less trauma, guilt, shame, and fear. The director figured out that parents needed to know there is a story and this story has hope in its ending. In order to get to the detailed level of a baby's communication, the parents had to get out of the narrative vacuum.

The director described:

"Even if all the rest of the team seemed to be sure about the concept, I could not make myself get rid off the odd feeling that kept bugging me like a small pebble of rock in the shoe. There was something so evasive about our mission that even at the risk of appearing thick-headed, I could not to let go off this strange, undefined concern. I weighed the excuse of being rather new in the team or just not understanding the complex field but still listened to the inner urge to start questioning. It was this intuitive warning of something missing that actually would turn the entire project around in a couple of months, to take us to quite a surprising route.

I kept asking, and somehow instead of finding clarity, I just found more confusion. This was a good sign – I wasn't the only simple-minded in the team, the one who couldn't grasp it. There really was something still to be uncovered. From being the only one lost, I had stumbled upon a tower with a good view of the entire project and was witnessing how there had been shutdowns of information between the many participants of the convoluted project geography. Nobody knew they actually did not know; they were just assuming.

After that I was completely sure about the fact we still did not actually have the full idea, just a ghost of it. Even without knowing it, I had known this. Somewhere within, the marrow and the juice were hiding and I was the one to let intuition take us there." (Celen, 2008)

The director observed her emotions and gained valuable information. Weak signal, the pebble in the shoe, was significant, and she was able to recognise that. At this point, her intuition and perception were having a dialogue, while she was able to distinguish these both (Figure 1.). She started to question, searched for uncovered issues. Reflecting her observations and emotions, she was looking for an answer or a solution, which would match her intuition. When she finally was able to formulate an idea from preconscious, she knew that she had known. The weak signal guided the director to listen her intuition.

In the citation below, the director is describing the moment when she experienced kind of 'Eureka moment', which is usually closely connected with intuition (Bastick, 2003).

"I had been going around and around, and it seemed like different people knew different sides of the whole thing but no one could point me to one direction. One conversation of significance I had was with one of our most experienced HUCH nurse focused in premature babies' communication. She confirmed that the main target audience would be the parents. This group was even more important than the health care personnel in terms of from whose perspective we should tell the story. As I

heard this, there was almost an audible click in my head. This was substantial information, the next clue I needed in getting to the bottom of this all. Then, of course, I asked the nurses how they thought the parents would like to see this information, how they would best grasp it. It turned out that the nurses did not really have this first-hand information from the parents even if they worked with them everyday. I was astonished. How was it possible that no one in the team actually knew, no one had thought about asking the parents before, and all we had was actually just a non-factual assumption? And on top of this all, we had built an entire project plan." (Celen, 2008)

When the designer reached the information matching her intuition, the solution popped into her consciousness. Perceptions were in line with her intuition, and it was easy to her to recognise the significance of it (Fig.1.). This example described above encouraged the whole design team to advantage and trust intuition. Furthermore, through the director's insight the rest of the design team started to understand that parents' emotions are capturing them totally. It is tremendously difficult to encounter premature child who struggles between life and death. There is more than just the plastic incubator separating parents from their babies. The director's story was an enlightening example of intuition as a guide. On the basis of this, the design goal was redefined (Figure 2.).



Figure 2. Redefined design goal and evolutionary process.

Intuition guiding the design team

At this point we were convinced that the complex design challenge could not be solved through linear working. A remarkable element was tacit knowledge of nurses, parents and other experts. Designers had to try to transform this tacit knowledge into design solutions somehow. This did not happen in conscious level but mostly through intuitive processes. The design team worked in a

hospital setting of such complex psychological and scientific issues that could not be understood comprehensively by mere digital media students. Through questioning, and recognition of possible weak signals, the designers had to stretch their capacity to the extreme in order to understand some characteristic of the new domain and various specialists' perspectives. In fact, due to parallel processing intuition is shown to be capable of handling a huge amount of information compared to rational decision-making (Plessner 2007).

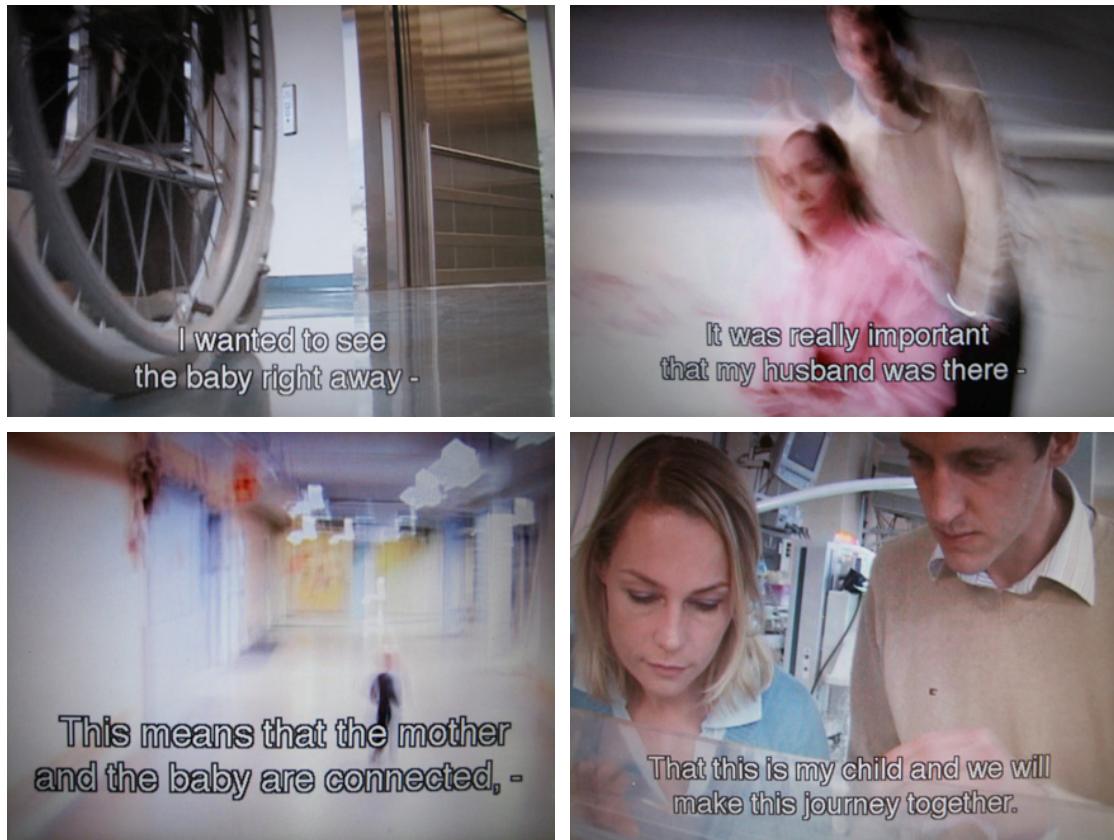
The design team's role became essential as a testing ground for intuitive ideas and preliminary thoughts. Not only the interpersonal dialogue but also the design team helped in the evaluation of intuition. In fact, all the designers in the team were free to choose areas to work with. Naturally the designers focused on the areas of personal professional expertise but also were eager to widen their expertise to brand new areas of design by learning from others in the team. The designers were welcome to utilize their best ideas – even at the last moment. Everyone got maximum freedom concerning their own input in the project, and everyone was encouraged to express even vague ideas to others. Weak signals and intuition were strengthened in the group – or then they just faded away. Along our understanding, this process enabled designers to utilize weak signals and the power of intuition as a basis of innovations. There was no need to force the designers to do certain tasks, because the project became the flexible part of the process – the platform was opened up and left all these issues floating. It was much more important for the authors to take care of this atmosphere in the team than to try to affect every aspect of the emerging work itself. The authors believe that through this approach the design team itself nurtured also the atmosphere of motivation, encouragement, and trust, which were important components when turning the intuitive ideas into reality.

The design team was living in a constant uncertainty. Upcoming new information could change previous plans totally. All the decisions had to be made as late as possible in order to enable new essential information to be added. In these great challenges, the design solutions were sought through combining artistic expression, medical science, digital media, and shared expertise. During the process, designers started to understand that intuition had been leading them to a very effective way of working. 48 hours of filmed material was edited to an outcome of two hours in the time frame given for editing of 20 min video in the beginning. In fact, adhering to public opinion or being trapped by over-thinking prevent decision-making and action (Norman, 1993). Only as the product was approaching its finish, designers noticed that they had hit many huge and important issues they did not even consciously aim at. The design team had gotten to the root of some topics that had not even fully surfaced for the professionals working there.

The outcome and discussion

When the project proceeded and solutions became visible, everyone felt that they had surpassed themselves. The design team had constructed a unique audiovisual tool, which has proven to be of significant value to Finnish neonatal care and other associated fields. And all this had happened in the schedule and the budget given. The authors dare to claim that trusting intuition, by making a decision to use intuition as the main working method for

the design process, even at the risk of failing, had a significant role enabling this.



Pictures 3. – 6. The audiovisual tool helps the parents to recognize their feelings, name them, and through this even encourages handle them.

The outcome of the production was a multidimensional approach fusing together art, documentary, and an information package in unconventional way. It was modern *Pro Arte Utili* where design was used in a non-physical way. The designers understood that design is not only artefacts, it can also be immaterial solutions like emotional support. The designers were able to create an outcome not seen earlier.

As mentioned earlier in the text, the original goal was set on January 2007:

1. To understand the special nature of premature babies' communication

On the top of this, the design team defined two new goals on March 2007:

2. To relieve parents' fears and to help them to handle their feelings
3. To create a story for parents with which they can identify

In the end of the production process, Nov-Dec 2007, three new ways emerged in how the tool can be used:

4. To give an overall picture of parents' situations and emotional worlds for nursing staff

5. To help nursing staff to handle their feelings and traumas caused by challenging working environment at NICU
6. To spread information to further treatment units (the locations where these babies will be transferred after leaving NICU)

Along with the information gained through feedback on Jan-Feb 2008, the tool will be used in other new ways:

7. To help parents to come to terms with their feelings in a deeper level, even after several years
8. With the tool even the extended family has access to the physical and emotional sceneries of a premature birth.
9. The tool functions as a basis for advanced training in psychotherapy

None of the designers would have dared to take on such a challenge if these results mentioned above had been the project goals in the beginning.

Intuition had led to the discovery of 2nd and 3rd goal, while intuition driven design solutions had led to the new ways to utilize the tool mentioned in topics 4,5,7,8, and 9. Guided by intuition and gaining the courage to go beyond expected, the designers had managed to make something truly functional, something that went deeper into the subject matter than anyone would have imagined. Feedback was the most convincing evidence of this, since the decisions made based on analysing the ways that intuition works proved to be the best design solutions. For instance, through the outcome the parents' emotional world was revealed to the nursing staff for the first time ever.



Pictures 7. & 8. Through the stories of five families, the world of prematurity was revealed in multiple perspectives.

Based on the discussions with the designers, the authors state that recognition of weak signals and ability to value them was important part of intuitive process. Weak signals were recognized and strengthened in the group through interpersonal dialogue and group discussions, which helped designers to develop solutions using the intuitive approach.

We also state that in this study case intuition was not dependent on designers' professional expertise. Relying on intuition, the design team ended up addressing many hidden issues of the NICU and to uncover and to address many concealed topics in the chaos and trauma surrounding an unusual parenthood. With the aid of this DVD tool the nursing staff and special care unit are now able to create new and innovative working methods, which can

better meet the needs of the parents and the families. This enables better growth and more balanced childhood for the premature baby.

In the end – feedback from parents

One of the most unexpected results gained through the feedback was that the tool was helping a target group, which nobody had thought of: Parents that have had their preemie several years ago.

Informant 7:

"It felt tremendously good to hear others describe their own feelings so clearly. Partly I understood things just now (after 5 years) when I heard others clothe their thoughts in words. When watching the DVD I cried a lot, but somehow that purified me. I am wondering if there will ever be a day when I do not cry anymore when telling about his prematurity? Can one ever recover from this or will this shock follow our whole life?"

Informant 21:

"Very touching, personal – opened connection to those feelings and events of the premature birth over eight years ago. I was astonished how powerful the watching experience was, because I thought I had got over it (having a preemie) while participating in peer support, and after delivering two full term babies after him, but the way of handling the subject through such a personal grip – not through fact-based or drama-like – was different from all the others I have seen or read about the subject before!"

Another new form of using the tool was revealed through the feedback as well. These two mothers describing their feelings illustrate the point well.

Informant 12:

"I couldn't even tell to my mom about the feelings I had. I'll send her this so that she can understand the kind of hell we lived in. I did not want that 'you poor baby' -attitude or others feeling pity for me. I even tried to write a letter to my Mom but it felt artificial."

Informant 13:

"This is a good tool for the relatives. Maybe I want them to understand at some point. They kept on asking difficult questions like 'will she become normal and healthy' and so on. We did not know the answers ourselves either – no one knew – we just tried to live one day at a time."

The whole stock – over 300 DVDs were sold out in one week after publishing. After two months of publishing date, second edition was already sold out, altogether 900 copies.

Conclusions

The authors stress that researching such a complex area, as intuition through one case study is only an interpretation to understand the multidimensional reality. However, this study case strengthened our belief that using a model for design thinking around understanding intuition is the basis of successful decision-making, which leads to innovative solutions. During this design

process designers were able to invent innovative solutions to complex problems. The authors found out that in this case-study, intuition was not dependent on designers' professional expertise. The recognition of weak signals as well as courage to trust them played a significant role in the design process. Through information revealed in discussions with designers, we believe that trusting intuition, and recognising and evaluating how it works in team situations led to a remarkable outcome compared with the amount of designers' knowledge in the subject area, prematurity. Intuition wasn't only a valid tool – it turned out to be the foremost tool in the design problem. It brought tacit knowledge of NICU, nurses and parents to consciousness through the outcome, which is focusing on emotional support. The multidimensional value of the outcome was revealed to the design team in the very end of the project through user experiences and feedback.

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Ms. Asta Raami

M.A, B.Ed. Raami has a background in education, graphic design and new media. She works as an independent designer and as a lecturer in Media Lab Helsinki in the area of creativity development. Her special interest lies in pedagogies and practices of shared expertise and knowledge building, as well as combining MA studies with real-life challenges. Starting next autumn, Raami will be working as a researcher in a project *Intuition in Creative Processes*, which is funded by Finnish Academy.

Ms. Riia Celen

M.A. Celen is a storyteller, who utilizes a wide range of media from drawing and writing to interactive digital media. A *different Journey* formed the artistic part of her MA thesis work in Media Lab Helsinki. Her work as a director allows her to combine her interests in visual and textual story-telling, values based leadership, and intuitive problem solving. Currently she is directing a documentary about deaf children and their relationship to rhythm.

Ms. Päivi Puntila

M.Sc, M.A. Puntila worked as a creative producer in the production *A Different Journey*. Her special interest lays in research focused on evolutionary production process and shared leadership, as well as in expertise in an innovative project team. She has a long professional experience in international business management and strategic marketing in ICT industry. Currently she is dealing with the building information modelling (BIM) in Tekla Oy.