What do they really want?
Reveal users’ latent needs through contextual Co-Creation

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Abstract

User research activities to gain insights about customers’ preferences and needs for new products or services are well known and often applied in early concept stages of the development process. Methods of Design Thinking such as Co-Creation or participatory design are well established. However, since users are not trained design professionals, the ideation and design sessions often end up in an assembly of concept elements with low innovation impact, not balanced and not well curated. Behind these “Concept-Frankensteins”, the actual needs and perspectives of the users are hidden and need to be revealed. This paper presents how to tackle this challenge by combining re-enactments, interviews, observation and prototyping in Co-Creation sessions, shown on a Siemens Healthcare Diagnostic Imaging CT case study. It is explained how to gain broad and deep insights in early stages of the development process, e.g. by life-size mock-ups to create analogous, but openly creative settings with on the fly concept solutions and designs addressing the discussed ideas. The paper is naming recommendations of successful Co-Creation. It closes with a discussion of challenges and limitations of the approach.

Introduction

Collaborative approaches, often summarised as Design Thinking (Curedale, 2013), to develop products, services, experiences or strategies are widely applied in today’s development processes. This includes human centred conception of consumer products (Jentsch, 2007), mobility services (Dettmann et al., 2013), user interfaces for software applications (Dettmann & Bullinger, 2014), advanced driver assistance systems (Simon et al., 2014) or medical devices (Mühlstedt & Helmreich, 2014) to name just a few examples. Case studies about strategy development (Schöllgen et al., 2012) and how design management is implemented in several companies and organisations is described in Sommerlatte (2009).

There is a wide range of well described methods that can be used in different stages of the development process. While creative and analytical methods such as benchmarks, mind maps, mood boards or problem trees are usually used in early stages when the intent is defined, other methods such as case studies, diary studies, eye tracking and interviews are mainly used to get to know people and context.
Validation studies such as user tests with prototypes, field tests or simulation studies are usually applied in later concept stages but should be integrated in the process as early as possible (Jentsch & Bullinger, 2015). However, there are some pitfalls in which researchers and product developers may trap when choosing the wrong set-up, asking the wrong questions or literally translate users’ concept ideas into products or services. This applies especially to innovative products since users tend to focus on already known interaction patterns, functions or paradigms. For instance, when asked which input device they prefer to interact with new infotainment functions provided by smartphones in cars, users are indecisive concerning gesture control and clearly prefer the already known steering wheel buttons (Häcker & Blaß, 2016). Generally it is hard or even impossible for users to put themselves in future situations or opinion about future technologies. While questionnaires on a meta-level, e.g. as shown in Roßner et al. (2015), usually give good indications for the direction of development, questionnaires about the hypothetic usage or acceptance of concrete future technologies (Abendroth et al., 2015) mostly lead to a description of the status quo that cannot be used as a guideline for innovative functions or technologies. Beggiato et al. (2015) combined interviews with observation to deduce information needs during manual, partially automated and highly automated driving. The interviews revealed that all information are rated as relevant whereas eye tracking data of the test drive indicated that information needs clearly vary between the different driving modes. This proves that user interviews play an important role for human centred design but should not be the only source or have to be translated into real needs.

One fundamental aim of user research is always to reveal users’ latent needs, meaning needs that users cannot express or are not aware of. Therefore, a combination of visits to workplaces, interviews and observations of users interacting with products or services can serve as anchors to gain relevant information on innovations and design optimisations. The downside is that setting up and conducting field research is usually costly and time consuming and consequently can collide with the requirement of test efficiency (Bühner, 2006). To verify and support the product development process, it is also possible to invite professionals and lead users to review and comment on the product innovations. More or less in set-ups that reflect the real context, concepts are presented, discussed and reviewed. If conducted carefully and by well trained staff with a certain distance to the concepts this can be a suitable approach to get feedback and relevant perspectives. Inexperienced and in user research untrained product owners run the risk to lead the interviews and the interpretation of the results in a positive direction for the concepts, to fit the results into the own personal mind-set – especially when testing and reviews happen at a later stage where the concepts have matured and down selected considerably.

The described challenges lead to the questions:

- How can users or stakeholders be encouraged and supported to put themselves in situations of interacting with a future product, service or technology?
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- How can user research be done as cost and time efficient as possible?
- How can users’ ideas and feedback be conveyed in product or service innovations?

In this paper, these questions will be answered illustrating an approach for gaining broad and deep user insights by combining re-enactments, interviews, observation and prototyping in Co-Creation sessions, shown on a Siemens Healthcare Diagnostic Imaging CT case study.

State of the art

Even though since the late 1960s publications stating that designers might take another approach to solve problems evolved, Rowe (1987) was the first to define and characterise the term “Design Thinking”. Since then, numerous publications have emerged and nowadays the term is widely interpreted and often used as buzzword. There are many models of what Design Thinking really is but generally it can be understood as a process that fulfils these four requirements (Meinel & Leifer, 2013):

All design activity is ultimately social in nature: Solve technical problems in ways that satisfy human needs and acknowledge the human element in all technologists and managers.

Design thinkers must preserve ambiguity: Innovation demands experimentation at the limits of our knowledge, at the limits of our ability to control events, and with freedom to see things differently.

All design is re-design: It is imperative to understand how users’ needs have been addressed in the past. Then we can apply “foresight tools and methods” to better estimate social and technical conditions that will be encountered in the future.

Making ideas tangible: In the past few years prototypes became “communication media”. Seen as media, they can provide valuable insights about concepts at any stage.

![Design Thinking process](image)

*Figure 1. Design Thinking process (Waloszek, 2013)*
Also Stickdorn (2013) emphasises the importance using physical artefacts and prototypes even for intangible services. There are process models of which steps a Design Thinking process should follow. The over the last years most common one by Plattner et al. (2009) is shown in figure 1.

Latest models, e.g. described in Uebernickel et al. (2015), advice not to use prototyping only in one phase, but include it in all phases. The above shown process is then only describing a macro-level where in each phase a human centred design process (ISO 9241-210, 2015) is fulfilled. With shorter iterations and phase-specific user involvement faster development and real human centred products can be realised. The question is always, which methods and tools should be applied to achieve the best results. Especially for the first four phases “understand”, “observe”, “point of view” and “ideate” Co-Creation methods are very helpful.

Co-Creation refers to activities that feature the following five characteristics (Roser et al., 2009):

- A form of collaborative creativity that is initiated by firms or organisations to enable innovation with, rather than simply for their customers.
- Co-Creation draws on a combination of management and marketing approaches, the psychoanalytic tradition and processes related to innovation, knowledge and group decision-making.
- A process that thrives on fantasy, play and creativity.
- Focusing on the quality of the interactions between people rather than on technologies per se.
- Intertwine knowledge and processes in an overall Co-Creation framework, rather than just enabling co-creativity, if wider impact is to be achieved.

Prahalad and Ramaswamy (2004) define Co-Creation as “creating an experience environment in which consumers can have active dialogue and co-construct personalised experiences” and that the experience for the consumer should be possible in real time. Taking this requirements in consideration, the potential of re-enactment as a method for Co-Creation becomes obvious.

In Gunn et al. (2013) and Halse et al. (2010) the basic theory about combining theatre theories with design and product development processes are described. Based on this theories the following case study describes the approach of how knowledge and experience of users can be used to derive design concepts and insights about latent user needs. Using creation, materials, prototypes, scenarios and the appropriate setting to gather valuable knowledge for product and process development.

Case Study

Background

Siemens Healthcare Diagnostic Imaging CT approached designaffairs with the question of how to speed up the user research process, how to gain broader and
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deepen insights in less time and how to evaluate and maintain the potential of new innovative concepts. The outset of the project was defined by a range of heterogeneous perspectives, individual insights and learnings from a range of projects and evaluations, and core hypothesis that the Siemens Healthcare desired to debunk or confirm. An initial catalogue of concepts had been defined and refined to be reviewed. What could be the shortest thinkable, but still valuable design iteration?

The classical CT set-up consists of the control room with CT imaging workstation and additional workstations for hospital-wide image and patient data handling, the CT scan room with the patient table and the gantry, shelves with table accessories and additional supporting devices such as contrast injectors. Ultimately, the CT tech provides the service of diagnostic imaging working across all the different interfaces of table, gantry and workstation. This working environment represents a diverse and complex landscape of different touchpoints. Looking at all these possible human-machine-interactions and the workflows that are linking the touchpoints, designaffairs identified a Co-Creation workshop as a suitable methodology. This ensures that not only the requirements and needs for single interaction on a device-level is taken into consideration but the whole process is looked at to reveal opportunities to optimise the working experience for medical staff. With Co-Creation, the complex context can be managed and user research, concept generation and evaluation set-up can be combined.

Co-Creation set-up

The Co-Creation workshop was conducted with four full day workshop sessions in a convention location close to Dallas. The convention location was chosen for legal reasons, privacy policies regarding patients’ data and most of all because of economic reasons since it is not possible to close a hospital’s CT installation for one week to conduct the workshop. Two seasoned user researchers and one industrial designer from designaffairs besides a Siemens Healthcare expert team lead the sessions. Incorporating two researchers allowed the fluid shifting of the researchers in and out from the conversation if a promising issue or aspect had been identified.

**Figure 2. Schedule of the Co-Creation sessions**
The industrial designer created on the fly concept solutions and designs with prototyping material addressing the ideas or issues that were discussed. The healthcare experts could insert ideas, questions and suggestions indirectly into the conversations, while allowing the user researchers to manage the open and non-leading dialog quality. The overall schedule is shown in figure 2.

One day before the workshop started, the environment was prepared within the convention location. This included installing the above mentioned classical CT set-up with mock-ups and cardboard prototypes, material for tinkering and rapid prototyping with foam core and cardboard as well as preparing the material and premises to introduce and welcome participants.

The Co-Creation session itself was video-recorded and consisted of five phases, that where ran through each day:

**Phase 1 - Internal briefing (~0.5 hours):** Prior to each session, before the participants arrived, the facilitators (designaffairs) and experts (Siemens Healthcare) discussed and agreed on which topics the following daily session will focus on. With this approach it was possible to use the observations and findings of the previous day and to develop deeper insights from day to day or to focus on topics that were not mentioned, yet.

**Phase 2 - Introduction (~1 hour):** After recruiting the participants, information and a questionnaire were sent to them to prepare for the workshop. Besides general questions concerning their experience and professional background they were asked to think about the main tasks, motivation drivers and frequently used devices in their daily routine and the main pain points they have. After arriving at the workshop location, the participants were carefully guided through three initial warm-up exercises and instructions.

1. **Organisational issues:** Explaining participants the time schedule, background of the study and NDAs.
2. **Co-Creation instructions:** Explaining the participants the general approach to get them familiar with the process and make them comfortable with the situation.
3. **Set-up instructions:** Showing the participants the prepared CT set-up and explaining possibilities and limitations of the prototype.

After this instruction each participant introduced him- or herself to the group, so that participants got familiar and understood each other’s background.

**Phase 3 - Workshop (~4 hours):** After this first hour introduction, participants were asked to explain the set-ups and procedures at their clinics or hospitals. One participant explained his or her daily routines on a given task, using the given materials and models, while the other participants, experts and facilitators observed and asked or discussed the actions the participant went through. In parallel to the dialog of the facilitators and participants, the industrial designer created on the fly concept solutions with prototyping material addressing the ideas or issues that were discussed.
To optimally facilitate the re-enactment of the CT scanner workflow and to allow the participants to go deep into the details of the table and the gantry, a brand-neutral, but life-size foam core model was used. The model was equipped with velcro strip to quickly attach information or within the workshop generated design models. This allowed for very fast iterations and moved the conversation constantly into concrete solutions. This designer-facilitator-participant pairing with continuous input provided by the healthcare experts indirectly through the facilitators proved to be an optimal set-up to ensure high speed and high quality outcome of the Co-Creation sessions. That way, new ideas could be used directly within the workshop to evaluate possible solutions on the fly and to re-enact the procedures with the instantly available material. This approach helped the researchers to identify issues which were addressed by ideation sessions in the situation. During each day the teams ran multiple times through all phases of the human centred design approach: gaining insights, ideating, concept development and user testing. Since this was continuously done in the context of a makeshift CT scan and control room, the participants were able to put themselves in the real working context, even though re-enacting in a convention location.

Phase 4 - Ranking and discussion (~1 hours): Following the workshop, the main ideas and concept solutions were discussed with the participants. Advantages, disadvantages, opportunities and threats were commented from the users’ point of view and participants were asked to rank the ideas and concept solutions according to attractiveness and desirability. In the end, the participants were asked in a role-play to sell their preferred idea in a two-minute presentation to their boss, played by one of the healthcare experts. The task was to convince him to procure the concept for the CT working environment, within a given budget. The healthcare expert playing the boss, discussed the idea from a purchaser’s point of view with the participant.

Phase 5 - Insights and adjustments (~0.5 hours): After the participants left, researchers and healthcare experts summarised the findings of the day, clustered them and condensed them into insights. The output of the Co-Creation session was documented with photos.

Participants

Four CT techs from local clinics and/or hospitals were invited each day. In total 13 participants, four male and nine female took part in the Co-Creation sessions, with at least two participants each day. Participants received an incentive.

To equalise the participants, everyone was asked to wear color-coded t-shirts with their first name on the front, the facilitators green (designaffairs), the healthcare experts blue (Siemens) and the participants red. A simple gesture, but an effective action to reduce boundaries of status carried by the individual clothing styles and at the same time clearly conveying roles during the workshop.
Results

The approach showed a very high impact and proven benefits, that can be summarised as follows:

*Deep insights into real value systems and underlying issues:* The team gained solid and deep insights into the real value systems and perspectives of the users. The range of isolated insights and sometimes diverging perspectives could be formed into a complete and holistic picture. The underlying issues could be identified and turned into larger opportunities.

*Supporting organisation-wide buy-in and commitment:* The gained holistic picture and its in-depth documentation of insights and supporting quotes, pictures and videos, has given the team a solid foundation for reasoning. A wealth of stories to tell were gathered that help to step beyond personal perspectives and diverse interpretation to gain buy-in and commitment in the organisation.

*Understanding the potential and promise of each concept in context:* Instead of a long cycle of user interviews, ideation in-house and concept reviews, the Co-Creation sessions allowed to condense a multi-month cycle down to a single day. Not only could issues be identified, but concepts developed and tested immediately in context. The re-enactments helped to understand the potential of each concept and approach in detail and fully in the context of usage.

*Innovative impulses for future solutions beyond technology:* The balanced approach of open issue exploration, concept reviews and strong guidance and facilitation to focus on key issues opened up new areas, or aspects that were previously not considered as crucial. Innovative impulses were identified and addressed with concept ideas. The openness of the participants for new conceptual and technical approaches could be explored and confirmed.

Guideline to successful Co-Creation

The main learnings of the case study and numerous successfully conducted Co-Creation workshops can be summarised in the following points for preparation, conduction and analysis and interpretation. This guideline not only applies to physical products but works as well for less tangible products like software or customer services?

**Preparation**

*Facilitators and participants:* Choose the facilitators and experts as carefully as the participants. Make sure that trained facilitators with a strong methodological background set up the workshop schedule and guide through it. Select experts from the right domain to guarantee that there is sufficient expert knowledge during the workshop. Spend time and effort in creating a detailed profile of the desired participants to extract broad knowledge from their point of view.
Schedule: Keep the schedule as open as possible, but within a defined framework. This helps to have a rough guidance throughout the workshop but gives space for improvisation, e.g. to go deeper in topics that pop up during the workshop. Consider sufficient time to instruct participants as precise as possible about the settings and take your time to let them get familiar with other participants, facilitators and experts.

Set up the context: The Co-Creation and re-enactment format needs to be carefully adopted to the questions asked and the development phase. It is easy to overburden a session with the desire for too much detail, or to create a too narrow solution field. A lot of effort should go into testing and adjusting the approach prior to the sessions.

Conduct

Atmosphere: It is crucial to create an environment as comfortable and safe for the participants as possible. Warm-up exercises, team t-shirts and theatre or cinema material, e.g. a film slate when a re-enactment scene starts, can help to create an open and equal atmosphere. Always keep in mind to ask simple and precise questions and to maintain the play character of the setting. The setting itself is best kept precise and in a way that participants are not scared to touch and move things or do something wrong when using e.g. a software-prototype. Participants need to feel comfortable to re-enact daily situations and interact and discuss with other participants.

Prototypes and iterations: Use Lo-Fi Prototypes, e.g. from cardboard or foam core for hardware or paper-prototypes or unstyled click-prototypes for software, that are as precise as necessary but as abstract as possible. This way, the initial prototypes are not considered as a final solution by the participants and their mind is kept open to explore new opportunities and to think out of the box of known concepts or solutions. During the Co-Creation participants can create their preferred concept ideas and use them directly in interaction with the prototype in a playful way. Therefore provide prototyping material within the workshop and plan sufficient time for iterations and idea exploration.

Guidance: The facilitator is the director of the scenario. He has to be flexible and as little intrusive as possible to keep the momentum of the play but also give careful guidance to keep the play and discussion within the given framework.

Analysis and interpretation

User integration: Analysis and interpretation are best done interdisciplinarily between participants, facilitators and experts straight after playing the scenarios. It is very important to not only use and explore the participants’ ideas and solutions within the re-enactment, but also a discussion at the very end to get a mutual understanding of the conclusions. Even though the researcher’s expertise is the crucial factor to generate new insights and opportunities from the discussion and observation, participants’ comments to a summary can be helpful for finding users’ priorities.
Post-meeting discussion: It showed very valuable, especially if Co-Creation sessions are held in several consecutive days, to sum up the results of each day with the facilitators and experts. This helps to identify topics for the next days that should be looked at more detailed and to adjust schedule for the following day, if necessary. In this sum-up, the statements and behaviour can also be put in context of participants’ characteristics and background. After each day there should be a set of documented main insights for further concept development.

Discussion and summary

Although the approach proved to be very successful and led to promising results, there are some limitations. It needs to be taken in mind that it is almost impossible to incorporate all disciplines that are involved in the product development process within the Co-Creation sessions. Therefore careful preparation is necessary and even though a lot of attention is paid to gain all relevant information prior to the session there is still the risk, that concepts or ideas are not realisable due to time, budget, legal or technical restrictions.

However, Co-Creation and re-enactment hold the potential to bringing the benefits of fundamental user research and of creative and agile interaction design together into a best-of-both-worlds approach. The compact human centred in-a-day-approach successfully addresses the challenges of the development process for most device or software manufacturers and customer service providers. These challenges can be the right level of concept refinement, the risk of late user feedback, limited access to professional experts, the pressure on development and testing costs, as well as the shortened product cycles, to mention a few. With the growing possibilities of immersive environments and apparatus like VR-/ AR-glasses or mixed reality devices (e. g. MS Hololens) the potential scope of the Co-Creation approach will even increase in the near future, promising more depth and speed at the outset of any product challenge.

Literature


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