PARTICIPATORY SERVICE INNOVATION IN HEALTHCARE: THE CASE OF VIDEO CONSULTATION FOR PARAPLEGICS

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ABSTRACT

Participatory Design (PD) provides a variety of tools and techniques for involving users in innovation processes. However, user involvement in PD is often limited to singular, face-to-face events supporting short-term rather than continuous collaborative relationships between users and system developers. Such a traditional PD approach is limited within a complex multi-actor context like the field of healthcare services. Based on an action research approach we developed a participation process, which builds upon open innovation approaches. It includes methods for *Distributed* PD (DPD) that use *social media* to enrich traditional PD methods, thus enabling users to participate in a distributed (i.e. virtual) way. We applied this methodological approach in a case study revolving around the delivery of video consultation services for paraplegics. The process and outcomes of participation were analysed through formative evaluation based on work psychological models. Our results regarding the combination of distributed, participatory idea generation with face-to-face scenario co-creation on basis of user-generated content show great potential for supporting continuous collaboration in service innovation.

INTRODUCTION

Involving customers or end users in innovation processes has attracted widespread interest in recent years. Various approaches and research fields have emerged dealing with how to manage and organize customer-driven innovation processes, be it from a business, design research, system engineering or social sciences perspective. Although these approaches may have the same goal of involving various stakeholders in innovation or development processes, they differ in what is developed and the methods and techniques used. Two approaches are central to the research reported here: Participatory Design and Open Innovation.

Participatory Design (PD) emerged in the 70ies and 80ies in Scandinavia as a work-oriented system development approach (Bodker, 1996). It states as a core principle that those who will be affected by a new system should be involved in the process of design, resulting in positive effects on the users' motivation and the quality of the products developed (Ehn, 1993). PD represents a mindset and ideology – which is that of democratization and empowerment - and puts emphasis on the relationship between users and developers (Muller et al., 1993). Although PD comprises a wide range of tools and techniques (see e.g. Greenbaum and Kyng, 1991; Muller et al., 1997), this relationship is mostly fostered by face-to-face interventions, such as future or co-creation workshops (see e.g. Sanders and Stappers, 2008). Even though such face-to-face methods significantly support both collaboration between users and developers and work-oriented system development, they are often singular events leading to short-term rather than continuous, long-term collaborative relationships between users and developers (Carroll, 2005). However, people within a service system (whether as colleagues or within business-to-customer relations)

are often *distributed* regarding time, location, resources, knowledge or organisation. This was especially true for the clinic in our design case. The question that arose was how to manage participatory innovation despite this distribution. Only recently Distributed Participatory Design (DPD) approaches have started to emerge (e.g. Obendorf, Janneck and Finck, 2009, Loebecke & Powell, 2009; Naghsh et al., 2006; Gumm, 2006), that deal with the question how to enable *distributed* participation across different contexts from a system engineering perspective. This approach has been driven by the fact that an increasing number of projects apply PD in physical or organisational distributed settings (Naghsh, 2006). Even though these projects mostly concern the development of software systems like virtual networks, they provide basic assumptions and approaches transferable to the development of new services. Their rationale is seen in the fact that PD-approaches show a limitation as they often concern the development of a „single, contiguous, customized software systems representing and supporting typical workflows within one organisation" (Obendorf et al. 2009).

Open innovation approaches take advantage of distributed knowledge resources by strategically integrating organisation-external knowledge or know-how of partners, providers or customers into organisational innovation processes (Chesbrough, 2003). Other terms used for customer integration approaches are e.g. customer- or user-driven innovation, co-innovation, customer co-creation, value co-creation, or crowdsourcing. Some successful examples of customers acting as co-designers can be found in the realm of product development, resulting in new business models, especially in the apparel industry (e.g. Threadless or Spreadshirt; in Piller, 2008). Also, open innovation platforms have been created to connect solution-seeking companies with solution-providing open communities (e.g. Innocentive; in Piller, 2008). However, in most of the open innovation approaches, the participant´s, end-user´s or customer´s part is limited to idea generation and product testing and often does not involve real collaboration between end-users and developers throughout the process of analysis, design and implementation.

We are therefore interested in combining PD-methods that support collaboration between users and designers/developers with the kind of distributed, more continuous forms of user/customer input, characteristic of many open innovation approaches. Our aim is to establish a participation process throughout the whole process from analysis, through ideation and conceptual design to implementation. Additional challenges arise for participatory innovation as our design case concerns the development and implementation of new healthcare services, being far more complex than e.g. the design of products such as T-shirts and sneakers. Thus, innovation can take part in various areas of a service, for example as a new service *concept* (Edvardsson, 1996), an adapted or new client *interface*, improved processes within the service *delivery system* or t*echnological options* like new devices for communication services. Furthermore, there often is a great variety of stakeholders and roles in service systems: In our case various healthcare professionals - nurses and physicians with different specializations - *execute* a service *provided* by a clinic or institution to patients (customers), including other stakeholders such as insurances or suppliers. Consequently, successful service *innovation* relies to a bigger extent on multi-actor involvement and collaboration in the process of idea generation, conceptualization and implementation. Therefore, it is worthwhile to combine established open innovation, user-driven innovation or crowdsourcing practices with the PD toolbox for user-designer collaboration when dealing with service innovation in organisations, especially in the early stages.

THE CASE OF VIDEO CONSULTATION FOR PARAPLEGICS

In this contribution we report on a case study in the field of telemedicine revolving around the implementation of video consultation services for paraplegics. We have been working with a rehabilitation clinic for paraplegics that comprises a wide variety of physicians, nurses and therapists, as well as paraplegics from all over the country representing the potential users of video consultation services. Paraplegic treatment and care of paraplegics is comprehensive and involves many different disciplines and patients that vary widely in their degree of paralysis and related health problems. The first idea for video consultation came from two departments of the clinic, the one mainly supporting paraplegics with artificial respiration, the other one providing additional care with home visits, which are time consuming and involve significant costs. In these fields of care, video consultation could be used, for example, for early diagnosis and follow-up care of decubitus ulcers, for advice and instructions regarding assistive technology or as remote support for handling technical failures with artificial respiration equipment, thus contributing to both the quality and efficiency of care and partly also relieving paraplegics from the strain of complicated transportation. Other typical rehabilitation activities include preparing paraplegics for and supporting them in activities of daily living (ADL), physio- and occupational therapy, regular medical examinations and treatment of complications.

METHODOLOGICAL FRAMEWORK AND RESEARCH OBJECTIVES

SUPPORTING DISTRIBUTED PARTICIPATORY INNOVATION WITH SOCIAL MEDIA

Involving users additionally to face-to-face methods in a distributed, technology-mediated way, as in many open innovation approaches, seems to be more suitable for fostering continuous collaborative relationships. However, open innovation is often limited to using web 2.0 tools for including users and customers in the idea generation phase (Lindegaard, 2010), not involving them continuously in the next stages of design, development and implementation. We see a need to bridge PD and open innovation here, since the continuous integration of external and internal ideas throughout the product or system life cycle could be supported well with PD-techniques. This was one reason why we developed a method for distributed participation including a variety of users from the very beginning – the stage of analysis

and idea generation. The other reason was that we faced the major challenge of physical and organisational distribution within the care and treatment of paraplegics, thus representing general difficulties when planning and initialising innovation in the early stages.
For that purpose we developed a method aiming to combine the potentials of open innovation, PD and DPD. A broad literature research on how to involve users in PD by using new media or social media gave a good base for how to develop a method that could expand the traditional PD-methods by distributed and virtual participation. Landry (2008), Hagen, Robertson and Gravina (2007), Go (2007), Katzeff and Ware (2006), Carter and Mankoff (2005) or Isomursum and Kuutti (2004) used self-reporting techniques in form of online/digital diaries, where users documented certain situations of their daily life with photos, videos and short texts. Other studies show how collaboration between users and researchers can be managed in the early stages when beingw distributed. For example, Lin and Okamoto (2009), Irestig and Timpka (2002) or Vaughan, Rittenbruch, Viller, Yuille, and MacColl (2008) report on methods regarding dynamic and iterative processes for collaborative, distributed scenario-generation for envisioning the future. We decided to use a self-reporting method in form of online diaries, similar to Carter and Mankoff (2005) or Hagen et al. (2007) combined with an approach to enable distributed, collaborative scenario-generation (as Lin and Okamoto, 2009). As we did not only want to let users collect material and send it by e-mail or post it on a blog, but also wanted to enable collaboration among participants and researchers, we set up a social network as platform for the documentation.
Our research question was whether and how social media tools combined with face-to-face methods could support both distributed user participation and active, continuous collaboration in analysis, design and innovation. In this contribution, we focus on the stages of idea generation and collaborative generation of future scenarios.

A SCENARIO-BASED APPROACH TO INNOVATION

In our concrete case of video consultation services for paraplegics we worked with scenarios according to a Scenario-Based Design approach (Rosson and Carroll, 2008; Van den Anker, 2003, 2006). Scenarios are concrete representations of a current or, mostly, future situation. We agree with Mietinen and Hasu (2002), who state that user needs and requirements should be analysed „on the level of the development of user activities and on the level of the situated use of the artefact." Scenarios support this analysis as they go beyond mere design ideas or ideas of system features in that they project a picture of how human activity and the context of use may look like in the future when the system is in place. So in a way they cover both the idea generation and implementation elements of innovation. Scenarios open up the design space in the way that they allow us to ask such basic questions as for whom (which users?), what for (which tasks or services?) and where (which settings?) the technology will be useful, thus driving innovation in the early stages.
Our so derived approach included the following stages (see also Figure 1):
Idea generation ("analyse and identify"): Distributed participatory generation of ideas and visions of potentially useful applications of video consultation based on concrete user stories from the participants' daily work or life, using social media.
Conceptualisation ("envision"): Co-Creating future scenarios of system use and the context of use as a basis for identifying opportunities, limitations and requirements through participatory evaluation of the future processes represented in the scenarios.
Enacting the future visions: Testing the future scenarios in simulations of future work and collaboration and carrying out pilot studies in the field to derive socio-technical system requirements.

DESIGNING AND EVALUATING PARTICIPATION FOR INNOVATION – A WORK PSYCHOLOGICAL VIEW

Our research question is related to motivational aspects, skills and resources that influence why and how users participate in the innovation and design activities within our scenario-based approach. Buur (2008) speaks of skilled innovation, meaning knowledge and skills that users can apply when participating in innovation. We wanted to have a closer look on the aspects that influence participation by analysing 1) which tasks within the innovation process could be fulfilled by users with the methods and techniques provided by us (face-to-face and virtual) and 2) how these tasks could or should be redesigned in order that users would participate to a greater extent or "better". Therefore, we analysed and evaluated the users´ participation and performance throughout the process (see also section Evaluation Methods) in the framework of a formative evaluation. The results were supposed to give insights on how to support us-

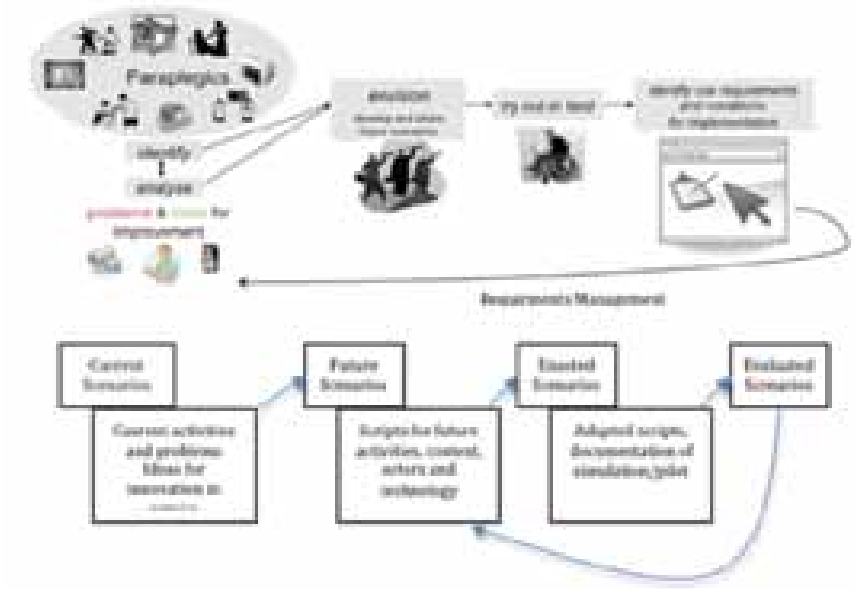

Figure 1: Participatory Service Innovation as a Process of Early Scenario-Based Design (adapted from van den Anker, 2003, 2006)

ers considering their skills, capabilities and motivation so that they would participate in an active and continuous way. This evaluation should help identify implications for the designers'/researchers' activities concerning the moderation and integration of user participation within the process.

For the formative evaluation of user participation and performance, we applied the Participatory Action Research approach (PAR, cf. Pilemalm and Timpka, 2008), where a design team of researchers and users collects, analyses and reports data, jointly implements changes with practitioners, and evaluates those changes in an iterative way. We attempted to involve users not only in the various activities within the innovation process of a new technology based service but also in the design of these activities. As we wanted to find out why users participate and how participation could be supported as a task on top of the normal daily work of users - whether by tools (media, technology) or instructions - getting back to basic job design criteria seemed to provide a mindset for analysing and designing participation. The concept of the "task" (for representing the various innovation and design activities) turned out to be a useful entity for our evaluation and is a core aspect of work psychology. For example, the Job Characteristics Model (Hackman and Oldham, 1980) as well as research on Task/Work Design (cf., for example, Ulich, 2007) investigate and describe aspects of the (work) task that influences (work) motivation, such as task significance/meaningfulness, task identity, skill variety, autonomy and feedback. We took these aspects as the basis for our evaluation, together with models concerning behaviour or engagement that is not part of formal job requirements, such as the concepts of extra-role behaviour (Organ, 1988) or perceived job breadth (Morrison, 1994). In addition, the theory of „Goal Setting and Task Motivation" (Latham & Locke, 2002) was integrated. It focuses also on factors that influence performance (Goal Commitment, Feedback and Task Complexity). The criteria of all these work psychological models were analysed regarding their transferability to participation (instead of work/job in general) and integrated together with more technical dimensions concerning the social media usage to an evaluation guideline called „Sum it up" (Table 1), which is explained in the following.

S	ignificance/Meaningfulness/Importance
U	se of media and participation tools/Task difficulty
M	otivation/Joy of participating
I	ntegration of participation into daily life
T	ask design/Identification with task/ goal commitment
U P	ser erformance

Table 1: Criteria for evaluating participation

Significance/Meaningfulness/Importance: As motivation for work depends on these criteria, we wanted to find out whether these factors show similar relations to participation as a task on top of the normal daily work of users.

Use of media and participation tools/ Task difficulty: As we applied different tools and techniques, of which the online platform for self-reporting is only one, we planned to analyse the usage and effect of these tools: How are tools and media used on the online platform and for what purpose in particular? What do users report about the difficulty of using the tools and fulfilling the various tasks? How do users react on tools used in face-to-face interventions?

Motivation - Joy of participating: This dimension focuses on the question concerning the impact the participation itself has: whether people have fun participating. Furthermore, we wanted to investigate the specific nature of those tasks that users prefer in sense of joy, including questions about users' experiences with former projects or tasks of their daily work and questions on the collaboration with others throughout the process.

Integration of participation into daily life: As most of the users in our case participated on top of their daily work, we wanted to find out more about the realisation of active participation in daily practice.

Task design/Identification with the task/ Goal commitment: This dimension reflects first of all work psychological aspects of participation. It is crucial for a person's work motivation to be able to identify with the task and have a certain degree of freedom concerning the task design or fulfilment. Furthermore, performing on a task depends on the extent to which a person is committed to the goal of the task, including that he or she defines the task as being useful for achieving progress. This is why we formatively evaluated in which way the task design influenced the participation of the users and which suggestions they made for adapting the tasks. One example of a parameter in task design that can be adjusted is the instruction given to the users.

User Performance: As user performance we defined the actual fulfilment of the various design tasks, meaning user contributions and outputs which can be used for the innovation process. This might be what users document on the platform, what they say in workshops or how they act in simulations.

METHODS

PROCEDURE: IMPLEMENTATION OF DISTRIBUTED PARTICIPATION

We started with an extensive contextual inquiry (Holtzblatt and Jones, 1993) consisting of workplace and home visits, shadowing, contextual interviews and spontaneous brainstorming sessions with healthcare professionals and patients. Its aim was not only to get to know the filed but also to identify potentially useful application domains for video consultation and, consequently, the potential users to be further involved in the process of participatory innovation.

As shortly described, we developed a self-reporting method for enabling distributed participation within the first stage of the innovation process, namely idea generation. For that purpose we set up a private social network and handed out mini-camcorders to the (potential) users, who were part of the identified application domains. They were asked to report on situations from their daily work (healthcare professionals) or life (patients) with photos, short videos or text entries, whenever they observed a situation of which they thought video consultation would be useful and then to upload their documentation to the platform. We conducted instruction interviews with each participant, where we explained the technique and its purpose

and instructed the participants how they should or could go about. We also explained that the aim was to collaborate on the platform for generating future scenarios together.

As we followed an action research approach and the following stage of conceptualization strongly depended on the outcome of the idea generation stage, this procedure is described in the results section.

EVALUATION METHODS

In this section we describe how we evaluated the process and outcomes of participation. We analysed participation through: 1) analysis of the activities and contents on the platform 2) evaluation interviews and discussion groups with those who participated on the online-platform 3) audio/video documentation and analysis of face-to-face co-design activities and 4) Analysis of moderation activities by the researchers. We applied a combined inductive-deductive approach in content analysis (Mayring, 2004) in the way that we used the pre-defined categories of participation (see previous section) and extended these with other categories in the process of data analysis.

Ad 1) The analysis of the user activities on the platform focused on the so-called user performance, i.e. the usefulness of the users' contributions for design. The entities we analysed represented different dimensions that showed the *extent* to which users participated on the platform, i.e. *temporal aspects* (frequency of entries, time of entry, latencies between entries), as well as the nature of their entries, such as *medium* and *features* used for each entry and *detailedness/content* of entries. We also looked at the kind of *scenario information* the entries provided, e.g. rationale for application/innovation, actors, physical environment, equipment or technology used, time and location, activities, needs or requirements.

Ad 2) We created an evaluation guideline that contained the dimensions outlined in the previous section. Interviews were conducted several times throughout the whole project with certain users of the online platform.

Ad 3 and 4) We documented all activities initiated by researchers that were of influence on the nature or extent of participation, whether in virtual or face-to-face collaboration with users. Whenever we adapted the method so that it changed user participation in some way, the activities and the effect they had were documented.

APPLYING SCENARIO-BASED, PARTICIPATORY SERVICE INNOVATION – FIRST RESULTS AND IMPLICATIONS

ORGANISING DISTRIBUTED PARTICIPATION FOR IDEA AND SCENARIO GENERATION

The contextual analysis offered a first opportunity to introduce the users to the idea of video consultation. As we got to know the users better through face-to-face interaction in the contextual analysis, we introduced them to the online platform. This analysis – as a first contact with potential users/participants - was crucial for building relationships for further collaboration.

User performance on platform: As we applied a scenario-based design process, we wanted to gain concrete situation descriptions or stories from the users, in order to require ideas and requirements for the usage of video consultation. It turned out that one of the key aspects for performing this participation task was the instruction we gave. We adapted the instruction several times throughout the process. At first, we had a very open version, asking users only to report whenever they experienced a situation where video consultation could be useful. The first entries after this instruction were mostly entries on a specific problem that healthcare professionals had experienced with patients. The entries were not very detailed. They only contained a short description of why patients contacted them (e.g. "a technical defect with artificial respiration equipment") or very abstract description of ideas (e.g. "support paraplegics when they travel"). In general, those entries did not include information about the people involved in the situation, activities or other information concerning the context. Therefore, based on our evaluation of the user-generated contents on the platform, we adapted the instructions.

Supporting participation by task design and revealing task difficulties: One adaptation was that we added key questions to the written and verbal instructions, so that the participants would understand what information a scenario description could contain (Who was part of the situation? Where have you been, where were the other persons? What exactly happened? What did you do? Why would video consultation be useful in this situation? What was the problem you had to deal with? When did it happen?). Still, the entries did not really get more detailed. A group discussion, in which the evaluation guideline was used, revealed some of the problems users had with the method. They reported that they felt the pressure to generate innovative ideas for video consultation, which was very difficult for them, as they could not really imagine how such a system could be used. In addition, they said that they just did not know what to show on the video or picture. This was also revealed in other evaluation interviews: the issue mentioned most often was the users uncertainty of what exactly they should show on pictures or videos. These findings suggest that the problem was not only related to the difficulty of providing detailed scenario information but rather to the difficulty of the design task. A suggestion made by the users was that the researchers should provide input so that they could think of potential applications more easily, like examples from other clinics already using remote consultation systems or creating a clearer focus for what to document. Therefore, we expanded the instruction sessions with a short contextual interview about the participant's work context and activities, to build a common ground for defining the focus of what to document together. We did this by asking them specific questions, also directly on the platform, which should provide a focus for documentation, for example "Think of all the patients you saw today or that week, what where their problems? Did you observe problems for which patients would not have had to come to the clinic but show it on video instead?" After those adaptations the entries on the platform became more precise, also including information about the patient, the context and the concrete activities carried out. Additionally, the type of content shifted: the entries were not only more detailed but also mostly concerned one concrete patient expe-

rience. Before, the entries concerned rather general ideas for video consultation. It shows the importance of both specific task instructions concerning what to document as well as a collaborative definition of the task, especially in the early stages of innovation.

Even if we could only gather about 40 entries and additional comments on those entries (with 13 healthcare professionals so far; see for some examples figure 2), they finally provided a good overview of the potential application areas and for some of the ideas also first inputs ("scenario pieces") for creating scenarios and deriving requirements. A ranking based on the amount of time an application domain or application (e.g. remote assistance and instruction regarding assistive technology) was mentioned was included in the steering group's decision which of the ideas we should pursue.

Use of media and participation tools: The participants used the media in different ways. Video therefore seems to be a flexible medium for self-documentation, since the participants used various possibilities of what to show on video, like the physical environment of a situation (e.g. filming a patient in his bed surrounded by various medical devices and equipment). Quite surprisingly, participants mostly used it as a reporting tool by filming themselves telling their patient stories. As it turned out in interviews, participants found it difficult to make videos in situations where they had patients, due to a lack of time and fears of intruding privacy and intimacy. As a result, it was not possible to show real-time activities of current workflows that could profit from video consultation. Even if all users reported that they considered video as a nice, easy and quick way to document, they were more active and precise writing blogs, partly also because we commented contributions, asking for more details.

Figure 2: User Generated Content for Service Innovation

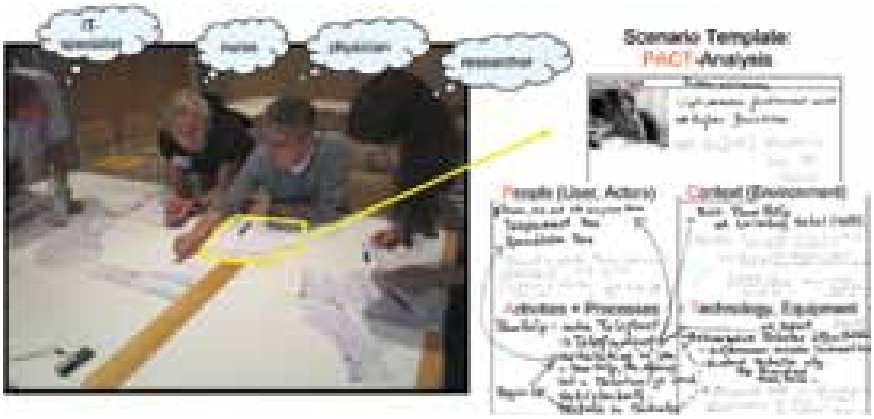

Figure 3: Co-Creating future scenarios with PACT-Analysis

Although we as researchers commented on contributions and communicated online with participants who participated on the platform, such exchange hardly took place between participants. This finding and the fact that participants had still difficulties in reporting rich scenario information themselves prevented scenarios from developing in a distributed, collaborative way. That is why we used the online user generated contents for developing scenarios with central stakeholders in a face-to-face situation, thus creating a "blended design" situation, as described in the following section.

USER-GENERATED CONTENT FOR SCENARIO CO-CREATION

The second phase included face-to-face methods such as workshops using the contents generated on the online platform in the first phase. The aim was to construct future scenarios as stories of future work and collaboration within health services for paraplegics. (In a next phase these textual scenarios would then be enacted within simulations to complement user needs and use requirements specification.) Therefore, we conducted several small future workshops (with each 3-4 participants of a certain application domain), in which we co-created future scenarios with health professionals by directly using the scenario pieces generated on the platform (see Figure 3 to 4). The structure of these workshops was such that we first created in dialogue with the workshop-participants a scenario of the current situation ("current scenario") in form of a rough flow or activity sequence model. We then asked specific questions concerning the effect video consultation would have on activities or other elements of the flow model. Then we co-constructed the future flow model by asking questions concerning the future context of use (see section "A Scenario-based approach to innovation").

Motivation and user performance in face to face methods: Two main insights can be derived from these sessions: Firstly, users participated and collaborated very intensely, even if the task of scenario-generation first seemed unclear to them. For example, we used a scenario-template for a so-called PACT-analysis (see Benyon, 2010 and Figure 3), which turned out to be too difficult to start with for creating scenarios, as the participants could not differentiate between the current and the prospected situation at first. Moreover, it was much more difficult for them to think about and name "people" involved in a scenario themselves then answering our concrete questions, such as "With which persons did you communicate during the situation?". Secondly, we found that the use of a rough flow model provided good support as we went through the different steps of a specific consultation situation together. The mentioned templates were helpful when already having created these rough flow model. Moreover, with the further workshops and as some users participated several times, participants became even more familiar with the technique, resulting in faster and more effective scenario-creations. Also, they more and more called out new ideas for how to transfer

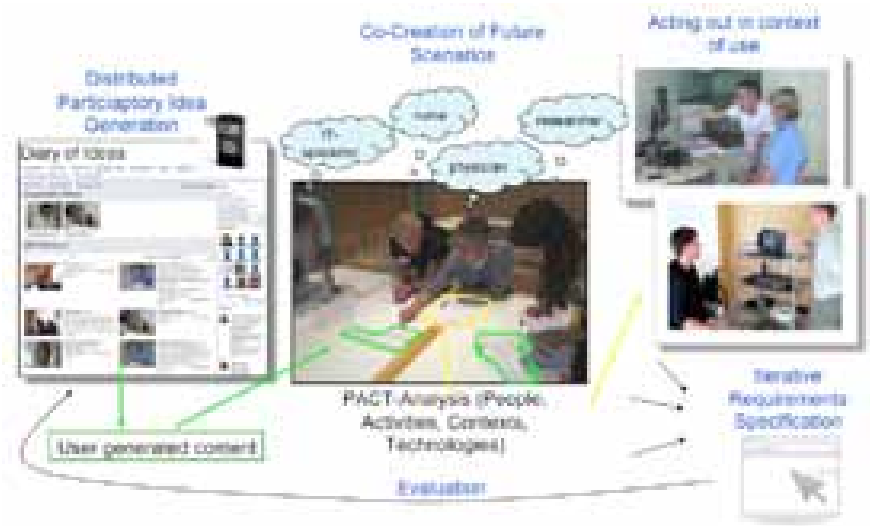

Figure 4: Blended Co-Design: Combined virtual and face-to-face tools for participatory innovation

the particular scenario to another field of care. In this way the scenarios provided a source for innovation.

To sum up, co-constructing the rough flow model and the future flow model by synchronous dialogues between researchers and users as well as using visual representations were two things that did not happen on the online platform but supported participation well.

We recently started to use the scenarios we co-created as contextual introductions to the participatory simulations with health care professionals and patients in which the problem cases from the scenarios were enacted with lo-fi technology as prototypes (see also Figure 4). For some of the users, these simulations resulted in the strongest motivation to participate so far: here they had the chance to try things out and play with the anticipated future, in a "secure" environment. This pleads for carrying out such simulations as early as possible, to raise motivation to participate also in a distributed way.

DISCUSSION

Throughout the first stages of participatory innovation we identified several issues for how (or how not) to involve users in innovation processes. First, users had difficulties anticipating an unknown future. We overstrained users with the task of documenting ideas for video consultation in a scenario format, trying to elicit rich scenario information. As the workshops later on revealed, scenarios were co-created because of a fast moving dialog: it was a highly interactive process i.e. walk-through in which the researchers frequently posed questions that the users answered, to elicit another question by the researcher. Such a synchronous interaction was not possible on our online platform, and the asynchronous comments we made could not have the same effect as there were latencies between asking and answering. Maybe, embedded chats, allowing for synchronous communications, as well as visual representation of work flows, could support online scenario-generation and encourage people in participating.

The task we assigned to users was to make the idea of video consultation tangible by identifying concrete situations for potential applications of video consultation, which turned out to be a difficult task. As the users who participated on the platform did not document out of problems or urgent issues, they needed time and support for reflecting on their daily work in order to identify potential future applications. Piller (2008) points to this issue by separating *problem broadcasting* from *solution seeking*, promoting the former when conducting local search. We experienced this difference when we adapted the instructions by asking which patient-related problems users had experienced that could profit from video consultation. This task was easier to understand and fulfil than only trying to find potential applications. Later on, throughout the scenario generation phase, the participants could imagine more easily where the system could be applied as they had received a clearer idea of what it might look like through the generated scenarios.

We therefore see three implications: Firstly, co-creating scenarios needs a preceding phase where people can reflect on their typical activities. Therefore, participants should be included more intensely in the analysis phase so that their first task is not to generate ideas but only to document on specific situations. Thus, they can use their self-documentation as a source for innovation, as we did when using the user-generated content in the workshops. Secondly, if possible, the analysis in the beginning should focus to a bigger extent on problems or aspects that could be improved within the service system. Literature on service design (e.g. Mager and Gais, 2009) might provide suggestions, e.g. by focusing on crucial touchpoints within a service system and letting users document them. Thirdly, another option can be derived from our experience in the future workshops where users came up with ideas of how the generated scenario for one application domain could be transferred to another. Therefore, a possibility would be to let those users, who already have had ideas, generate scenarios with designers/design researchers and then pass them on (virtually or in workshops), so that other participants could use them as input and think of further ideas for applications. We just started to prepare the scenarios generated together in the future workshops in a (visual) way so that they would be understood easily by others. Those could be used for further scenario workshops, for virtual collaboration on the scenarios, for evaluation and for simulations as well. To sum up, the first scenarios could represent a source for innovation. Moreover, also the simulations as being hands-on experiences can be used for stimulating idea generation much more earlier in the innovation process, especially as they turned out to have strong motivational effects on the participants.

All in all, task difficulty and task identity seemed to have strong influence on the users' motivation; the former revealed during the idea generation task being too difficult as it concerned rather solution seeking than problem broadcasting, the latter regarding the strong motivational impact the hands-on experiences had, as participants enacted situations where they could

show and use their expertise, being more secure in what to do. Moreover, involving users in the task design and adapting the tasks according to these collaborations turned out to have moderating character, especially as far as instructions for user participation were concerned, being a kind of interface between researchers and users.

OUTLOOK

In the framework of a "blended co-design" (combining virtual and face-to-face methods, see Figure 4), our further work will concern the integration of the (video recordings of the) simulations on the platform, enabling a participatory evaluation also for those who have not directly participated so far. Future work will also address the aspect of interaction between the participants on the platform, which were rare in our case study, to stimulate the collaborative development of design solutions and implementation concepts through scenarios.

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