

SOFTLANDING: SERVICE CO-DEVELOPMENT FOR A CHILD HEALTH CARE CLINIC

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ABSTRACT

This paper outlines the process of ‘SoftLanding’, a remote interpretation service prototype co-development for a maternity and child health care clinic, their immigrant customers and a company providing the interpretation service. In this research paper, we explain the key factors of the research, facilitated co-design workshops, prototyping activities, participatory technology reviews, and the final evaluation of the service prototype tested in a simulated treatment setting. Our findings show that the used methodology is suitable for co-developing service prototypes, especially with complex service systems enabling improved work experience and fluent customer experiences.

INTRODUCTION

The Finnish child health care (Neuvola) was founded in the 1920s by Finnish doctor Arvo Ylppö. Since then Neuvola's main purpose has been to provide follow-up services for pregnant mothers, pre-school children and their parents. In Finland, municipal health centres are obligated to provide child health care services to citizens, including non-Finnish speaking clients such as immigrants.

SoftLanding was started when SmartLab design laboratory residing under IT Administration with the maternity and child health care and A-Tulkkaus Ltd. established a project to co-develop a remote interpretation service. All stakeholders of the project operate in the city of Vantaa, thus the development

context is public services. All in all, close to hundred different languages are spoken in Vantaa and potentially all of them are used in health services, though in most cases only the ten most common ones are used.

Interpretation as a service follows certain ethics. Interpreters respect the anonymity of the client and consent to confidentiality. In practice, the interpreters operate by the side of the client and try to be as invisible as possible using only their voice to mediate understanding. For example, in medical ultrasonography during pregnancy, client privacy is a priority. In such a case, the interpreter operates from behind a curtain. However, it is acknowledged that albeit the interpreter operates in the background, a stranger involved in the treatment situation might frustrate the share of critical information.

Phone interpretations had been previously tested at the Vantaa child health care, but the experiments had failed for several reasons. According to Health and Social Welfare, at the start of the project less than 0,5 % of all interpretation was made remotely. In general, personnel were satisfied with the quality of interpretation, but had strong opinions about the remote interpretation service. For example, unreliable technology and poor sound quality affected negatively to the willingness to use mobile phones and accessory technologies such as headsets. However, the most important reason for resistance was not the technology itself, but the lack of strategy in advancing the use of the technology. The staff were not given a chance to influence the design of the new remote interpretation service or the way it was applied, and consequently their enthusiasm towards the service was low.

The initial idea for this project was introduced by Health and Social Welfare department. At the beginning of the project the stakeholders agreed that SmartLab facilitates the co-development activities and the maternity clinic and A-Tulkkaus provide the required personnel to join the design workshops and resources for testing the service prototype. The initial design brief for the project was to create a service that is easy to use while also enabling good overall user experience. Based

on the premise of this project, the following research challenge was identified.

How to design interactions for a sensitive treating environment?

Throughout the project we emphasized a view where treatment can be seen as a metaphor of hugging a teddy bear, thus the project name SoftLanding. By following a co-development approach a service prototype was designed enabling improved work experience and fluent user experiences. The key idea of the resulting service prototype is that it allows nurses and the clients to communicate via remote interpreter online and on-demand.

THEORETICAL BACKGROUND

In the research context co-development can be seen as a collaborative design and development effort engaging stakeholders as co-developers of a service development project. Holistic approach involves all the stakeholders to take part in the co-activities resulting shared understanding of needs and goals of the project (Hyvärinen et al., 2015). As stated in the existing research literature, co-design activities typically aim at searching new potential directions and producing design ideas and solutions. Further, co-development can be utilized in creating shared understanding of the topic or expressing experiences collaboratively (Mattelmäki & Visser, 2011). While the co-design operates in fuzzy front end of design, technological prototypes are also needed to create realistic testing situations for evaluating the experience in real life context (Keskinen, 2015).

When the goal is to design co-experiences, design and development activities should happen in the field, in the real social and physical context where the future users operate (Battarbee, 2004). This approach, co-experience, builds on an understanding of the experience as a social interaction where users themselves create the experience by interacting with humans through facilitated materials and technologies (Battarbee, 2003). For example, designed artifacts, especially personal communication and digital media products, environments and systems can facilitate this kind of use.

When the goal is to design something that evokes specific experiences, a goal of the experience is needed. As Desmet and Schifferstein (2011) say, one important challenge in experience design is to design something that is expected to evoke a specified experience. Further, experience design takes the intended experience as a starting point, and the product or service is designed with a specific experience driver in mind (Hazzenzahl, 2010).

The goal of the user experience can be given by a customer or a group of stakeholders that want to design something together. These experience goals may provide sources for inspiration, ideation and innovation in facilitated co-design workshops. Also, they help communicating the experiential goals to the participants during the development of services, and finally conducting the desired evaluation of the service prototype (Väättäjä et al., 2015).

Defining the appropriate experience goals is a critical point in the design process, because the experience goal needs to be meaningful and suitable for the target context of use, and in line with the brand experience, to truly engage users (Kaasinen et al., 2014). There are several sources that can guide the design to evoke specific experiences. One important way is empathic understanding of the users' world by stepping into the users' position.

When co-developing services the facilitator of the project guides the creative cooperation assisting cross-organizational groups and networks in creating understanding of the to-be design (Rasmussen, 2003). The facilitator of the project chooses the right design materials, tools, methods and environments, and is essential part of the facilitation. Appropriate design tools are needed to construct early ideas and enable people to explore and express their experiences through prototypes (Buchenau and Suri, 2000). They operate as boundary objects and are malleable enough to be perceived and used differently by different actors and still understandable across social worlds (Star and Griesemer, 1989). Throughout the project, the role of the facilitator is to provide means for the participants to explore and express their experiences and to construct and test ideas.

In the following section, we describe the methods of the project and focus on answering questions concerning contextual, physical, sensory and social factors thriving designing for specific user experiences.

METHODOLOGY

This research follows a human-centred design approach for designing and developing services and interactive systems. In the human-centred design all stakeholders take part in every phase of the co-development process. This is done to ensure that participants feel ownership of the project and that the design process targets the identified needs of the stakeholders.

Following the constructivist design research model (Koskinen et al., 2011) the design artifacts created during the project were developed in phases. During the project, we arranged three co-design workshops, two participatory prototype review sessions and one final testing session. Artifacts created in the co-design workshops and participatory prototype review sessions allowed us to effectively scrutinize and re-evaluate the objectives of the project. Methods used in the project can be divided into three sectors of design research.

- Co-design
- Prototyping
- Participatory Testing and Evaluation

The overall user experience goal given by the customer provided us overall inspiration and human-centric mindset to follow throughout the design process. At the beginning of the project when designing the first workshop, three user experience goals were identified as follows.

- Feeling of security
- Feeling of trust
- Feeling of pleasantness

During the project, we reflected upon the experience goals and to better understand what kind of social interactions should be designed. In the following sections, we define the used methods and their objectives.

DRAMA METHODS, EXPERIENCE PROTOTYPES AND SCENARIOS

A Drama methods and Experience prototyping workshop was organized at the beginning of the project. The main idea of the workshop was to focus on creating future oriented scenarios for the maternity and child health care by looking into how remote interpretation situations are currently carried out and reflecting on situations that generate friction among participants. The workshop was organized in the 'black box' of a local theatre (Figure 1).



Figure 1: Acting in Drama methods and Experience prototyping workshop.

Participants of the workshop were selected in such a way that both organizations were represented; a nurse responsible for the child health care unit and two interpreters. All three also operated on development roles in their organizations. Additionally, two members of our team took part in the workshop and one researcher facilitated the workshop. In order to prepare the participants for the upcoming workshop, we sent them an assignment in advance. Basically we asked them to describe an ideal child health care service established on mutual understanding and companionship. The participants were also asked to extend their answers to their own experiences. At the

beginning of the workshop we asked the participants to share their thoughts with others. This preliminary task set the mood for the workshop.

The second task was to create a future scenario representing an ideal interpretation situation in the context of child health care. At first, the participants created a short narrative in a written form, including a structured story and roles. The narrative was used as a starting point for acting and improvisation.

To assist in the creation process and to inspire the participants, they had access to visual aids, i.e. newspaper clippings and objects representing futuristic smart devices, i.e. virtual reality glasses, wearable smart jewellery or watches or mobile devices. These tools gave participants "a participatory language" to construct early ideas enabling people to explore and express their experiences through lo-fidelity prototypes. The prototyping tools were malleable enough to be perceived and used differently by different actors and still understandable (Figure 2).



Figure 2: Experience prototypes used in the Drama Methods workshop.

Third task was to create a mini play of a future interpretation service in the context of child health care. We specifically asked the participants to take a role of a client; consider how they feel and what consequently creates a good customer experience. While on stage the members quite quickly found the means to interact. After few improvising rounds the group presented a scenario which was recorded on video.

The recording was viewed together and the viewing followed by group discussion focusing on observing the interactions between the three main characters, that is the interpreter, the client, and the nurse. Based on the discussion the group found various situations that could be enhanced. After a short analysis, a new practice was introduced: by the wave of a magic wand anyone could interrupt the play and propose a change of action. This allowed participants to introduce various enhanced processes, working practices and innovative technology proposals. Based on the workshop outcomes, we created an illustration depicting the envisioned customer journey (Figure 3).

Making an Appointment

Customer makes an appointment by phone or digital form.

SoftLanding: an Interpretation Service for Maternity Clinic Customers

Arrival to Maternity Clinic

Interactive display guides the customer to Info Desk. Native language can be used for communicating with the display.

Nursing staff arranges an interpreter for the appointment.

At the Info Desk an interpreter device is given to the customer. The device is also used for filling advance information.

Visiting the nurse

Interpreter device is used for communication between the customer and nurse - both use native language.

Viewing treatment history

The customer may study her treatment history using digital service.

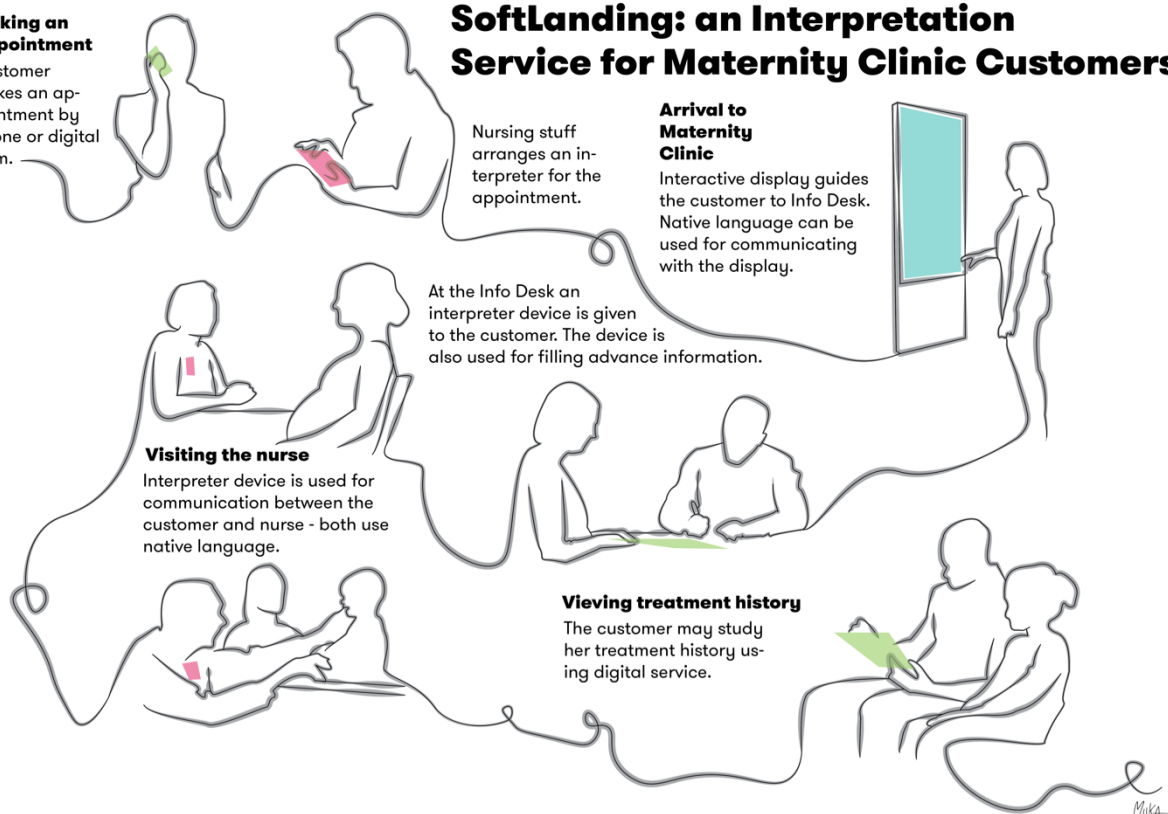


Figure 3: Future oriented customer journey.

The customer journey presents key points in the customer-nurse-interpreter relationship. Also, the illustration depicts future oriented technologies that might become commonly available in the future. The main purpose of the illustration was to operate as a communication tool and to help us in facilitating the dialogue further while making design decisions. We presented the illustration to the stakeholders and after a review took a step towards creating a service prototype.

SERVICE PROTOTYPE

In the prototyping phase we created two types of prototypes: 1) 3D printed case for a mobile device and 2) technologies enabling connectivity and automatization. The main idea of the service prototype is that the interpretation can happen real-time 24/7. For example, a health care customer could arrive to the health centre without a pre-booked appointment. In such a case, the nurse makes a contact to the interpreter on-call. From the technological point of view, the proof-of-concept system consists of technological devices establishing connection between the participants and enabling remote interpretation. In our prototype system, contacting the interpreter on-call and making the online call was made using Skype for Business application. The model of the phone was Samsung Galaxy A5 due to quality of sound and video image. In figure 4 information flow of the service is depicted in detail.

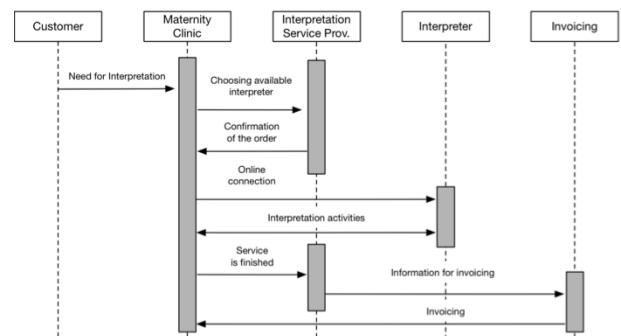
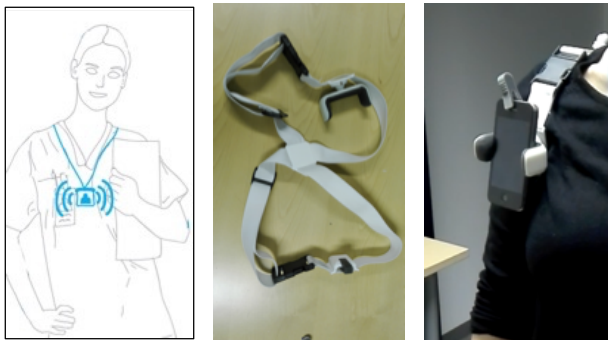


Figure 4: SoftLanding information flow states.

In figure 4, the white boxes on the top represent states of the service use. Grey boxes represent the technology and arrows the direction of the data flow together with the annotated user action. Our prototype system was realized in full only excluding the invoicing.

When designing the case, we focused on the lack of natural communication in the existing interpretation service. This decision was based on the user experience goals set and insights claimed at the drama methods workshop. Often the mobile device is placed on a surface, far from the actual communicators, resulting in poor audio quality and at worst misunderstandings between the participants. Also, we wanted to support face-to-face communication which would improve fluent interaction and a sense of presence and trust. The

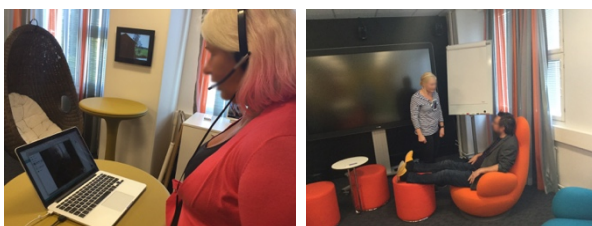
main idea of the wearable mobile case is that it can be worn as a clothing accessory as seen in figure 5.



Figures 5, 6 & 7: Wearable 3D-printed case holding a mobile device.

On left in figure 5 is a sketch of the interpretation device. Image 6 on the middle depicts a wearable solution and on the rightmost image 7 the wearable device is worn by a user and the case is holding a mobile phone. In addition to wearability the case is malleable and the user can to unlock it from the strap and place the case and the attached mobile phone on a table, easily adjust the angle and thus achieve clearer sound and vision.

We tested the process flow using early prototypes concurrently in a process simulation workshop. The workshop participants included two nurses from child health care and three interpreters. At the beginning of the workshop, we introduced the prototypes and explained the system in detail. Next, the participants were allowed to freely try out the wearable 3D-case and we reviewed their first impressions. As soon as the participants had become acquainted with the artefacts, we asked them to assume their roles and act out the service scenario using the prototypes. Figures 8 & 9 depict a basic interaction setting between the three users; that is an interpreter, a nurse and a patient.



Figures 8 & 9: Testing the prototypes in a simulation workshop.

On the left, the interpreter interprets through Skype video call. Through the headset the interpreter hears the discussion between the nurse and the patient, while the microphone allows her to speak as well. Online video image is screened on the computer. On the right, in figure 9, the nurse standing is examining the patient. The nurse is wearing the case attached with a mobile phone using the Skype application. In this case, an online video call was made and a video and audio transmitted to the interpreter's laptop.

The workshop allowed us to go through the designed service scenario step by step and evaluate whether the prototype's functionality corresponded to the requirements. With the information from the workshop we were able to move forward to the final evaluation of the service.

TESTING THE SERVICE PROTOTYPE

The final one day test session was arranged in December 2016. To test the service, we invited five female immigrants who had experience from using maternity and child health care services. These experts represented three languages: 1) Somali, 2) Arabic, and 3) English. In proportion, three interpreters with the same languages participated to the test. In the child care, one nurse provided treatment. Two researchers conducted the test, one in each location.

The test took place in real working environment, in facilities provided by the two main stakeholders of the project. Remote interpretation was made from the premises of A-Tulkkaus, while the patients were treated in the Maternity and health care centre. Physically, the premises were located along the same road, but in different buildings.

In our test, we simulated a real scenario, where the nurse could contact the on-call interpreter at any time. Due to tight regulations on protecting the anonymity and privacy, real treatment situation was not possible. Therefore, we designed the situation as real as possible, though everyone knew the situation was simulated. The basic setting was that a nurse could at any time call any of the interpreters by choosing from a list of available languages (Figure 10).

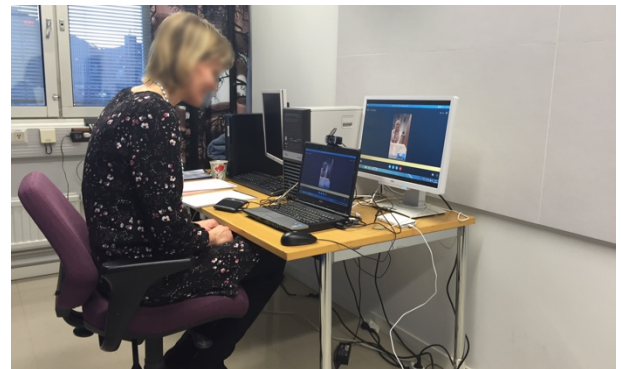


Figure 10: An interpreter on duty and interpreting for a nurse and a patient.

Before the test, the interpreters were informed that they could receive a call whenever they were online. All in all, we tested five interpreted treatment situations. For simulation purposes, identical medical ultrasonography situation was staged to all cases. The client was allowed to choose between audio only or video interpretation.

SERVICE EVALUATION

During the final simulation, we conducted a questionnaire with the patients. The questionnaire was used to survey how the users valued the service, how they experienced the service and whether they would like to use the service in the future. The evaluation was conducted using Experimental User Experience - method, which is originally created to evaluate the user experience in public interaction systems (Keskinen et al., 2013). Additionally, we used observation as a method for contextual information gathering by studying the interpreters in their work during the test. After the test, we conducted solo interviews with a nurse and the interpreters, in order to find out how they experienced the new on call practice.

RESULTS

As result, the tested prototype service was thought to be innovative as it brought added value to all the stakeholders. The questionnaire included two sections: 1) 6 semantic differential question pairs that form the core for measuring experiences and 2) eleven Likert scale questions for specifying pleasantness, trustworthiness, functionality and willingness to use the service in the future. The patient core experiences are presented in Figure 11.

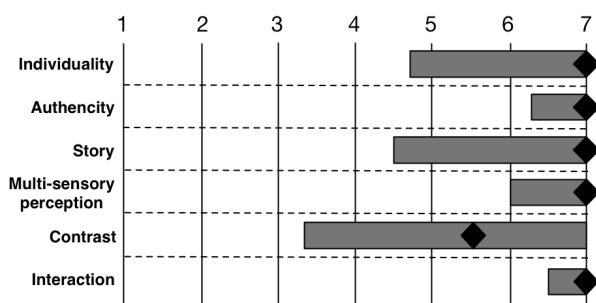


Figure 11: Experiences (n=5). Boxes represent the interquartile ranges, and diamonds represent the median values.

On x axis value 1 corresponds to the most negative and 7 to the most positive experience. All in all, the new system was received remarkably positively as core experiences on all measures rose to a median of 7. In general, all the patients experienced the service something they would like to use in the future and they would recommend it to their friends. Additional questions regarding pleasantness, trustworthiness, functionality and willingness to use the service in the future received value 5/5 on Likert scale. Overall experience of the service prototype received value 5/5.

Later observations and interviews revealed that making the calls also suited the child health care nurse and the interpreters. They all stated that the sound and vision quality was good enough and serious misunderstandings were not noticed. In earlier workshops, the interpreters had said they would like to use video calls for clarity reasons. In practice, video as a media is more direct and facial expressions help communicate meaning more

efficiently than mere audio. For example, one of the interpreters stated:

“-- Conversation is more efficient through video phone calls --”

In our interviews, all the interpreters mentioned that they would like to start using video calls increasingly. According to one interpreter, the relationship with the client in remote interpretation would become more human with the addition of video. When using only sound, interaction is hindered and it falls to the background.

“-- Interaction through video is more human-centric --”

On the other hand, audio calls were thought to be more neutral in comparison to video calls. For example, one of the patients chose audio because she wanted to protect her privacy. Wearable device used by the nurse worked well as a proof of concept prototype. The nurse mentioned that the design could be improved by making a more lightweight mechanism for attaching the phone. This would make it more unnoticeable. All in all, the idea of the case was considered functional and it was thought to enhance the fluidity of interaction. According to our observations the sound quality was improved and face-to-face interaction supported in the test situation because of the wearable case. When the phone is attached to the body, nurses remember to direct the phone towards the patient.

DISCUSSION

In this project, we took a constructive design research approach for co-developing a remote interpretation service for a maternity and child health care clinic, their immigrant customers and a company providing the interpretation service. Our main principle was that the whole project is human-centred, and the stakeholders take part in every phase of the co-development process. This was done to ensure that participants feel ownership of the project and that the design process is targeted towards the identified needs of the stakeholders.

Following the constructivist design research model the design artifacts created during the project were developed in phases. Artifacts created in the co-design workshops and participatory prototype review sessions allowed us to effectively scrutinize and re-evaluate the objectives of the project. Drama methods and Experience prototyping workshop provided the stakeholders with an opportunity to emphasize and take a first-person view on the child health care customers.

The outcome of the workshop was materialized in visualizing future scenarios that depict possibilities of innovative technologies and human-human interactions. The visualization provided means for the stakeholders to communicate their vision and refining it to functional service prototypes. In the project, two types of prototypes were designed and developed: 1) 3D printed wearable device for a mobile phone, and 2) the service unfolding enhanced communication processes through socio-technical interactions. The resulting service prototype was tested in a simulation workshop and finally in real life context together with five female immigrants.

Used Co-development approach provides practical means to create innovative solutions when facilitating projects involving complex socio-technical systems within cross-organizational networks. Also, organized co-design workshops and participatory analysis sessions allowed us to reflect and communicate motives of the project in a clear and consistent way, focusing on specified experience goals.

When considering an organizational change, it could be said that this methodology planted a seed, which may allow a human-centred development culture to flourish and grow. In practice, the project has influenced the stakeholders to adapt the findings to their organization. For example, A-Tulkkas has started a pilot, where they provide on-call service for their customers. Also, Health and Social Welfare department of the city of Vantaa chose the same phone models used in this project. This includes thousands of mobiles bought for the nurses across organizations.

In our test five patients of the service considered the remote interpretation natural and fluent. They valued the service by stating that it brings about clarity and efficiency to their child health care needs. We understand that the service test was carried in relatively short time within one day and with only five users. Therefore, we may draw only limited conclusions. However, all the five informants stated unanimously that they would like to use the service in the future and they would recommend it to their friends.

The central finding of this research was that when designing services in cross organizational context, creating service systems should be in focus. This finding was revealed in a final stage of this research during the test. In one test, the nurse had guided the patient to continue to the social insurance institution nearby. The existing problem with the services embedding multiple systems is that customer relationship is vanished after the treatment visit. For example, in this case the patient would like to visit the social insurance institution right after the treatment visit. However, the result is that she needs service of the interpreter again and possibly her medical data is transferred to next service provider.

Form experience point of view services with broken links are not satisfactory at all. In the future, when

designing complex service systems, designers may need to expand their design to thrive co-development culture with open-ended organizational agenda of change. In line with Patricio et al. (2011) we agree that in the new service-centred paradigm, value is no longer embedded in tangible offerings. Instead it is created collaboratively with customers through relational exchanges in interaction experiences (Normann, 2001; Vargo & Lusch, 2004). In practice, this means that service providers may only propose value propositions instead of premade offerings. In this model, the customers interact within the service and transform value propositions into value through use. Drawing from our experiences, we may say that the most interesting design challenges lay in the fuzzy edges of the organizations where the customer vanishes to horizon.

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