A Service Design Thinking Approach for Stakeholder-Centred eHealth

Eunji LEE[1]
SINTEF, Norway

Abstract. Studies have described the opportunities and challenges of applying service design techniques to health services, but empirical evidence on how such techniques can be implemented in the context of eHealth services is still lacking. This paper presents how a service design thinking approach can be applied for specification of an existing and new eHealth service by supporting evaluation of the current service and facilitating suggestions for the future service. We propose Service Journey Modelling Language and Service Journey Cards to engage stakeholders in the design of eHealth services.

Keywords. eHealth, stakeholders, service design, service design techniques

1. Introduction

eHealth is a healthcare practice supported by electronic processes and communication [1]. Stakeholders in eHealth services play important roles when adopting or integrating new technologies in their work [2, 3], but the design process of eHealth services is characterised by insufficient stakeholders' engagement [4]. Failure to identify stakeholders and their needs in eHealth projects resulted in customers not being satisfied and required redoing of many parts of the projects [5]. To improve this situation, service design thinking approach can be considered. Service design thinking is an interdisciplinary approach to make services more useful, usable, desirable, efficient, and effective [6]. One of the five core principles of service design thinking is co-creation: all stakeholders must be involved in the service design process [6].

Several studies have revealed the opportunities and challenges of applying service design techniques in health services [7-12] . However, there has been little attention on the application of these techniques in eHealth services. This paper considers the following research question: How can a service design thinking approach be applied in eHealth service design?

2. Methods

We conducted a case study in Norway from August to November 2014 to evaluate a message exchange module in an Electronic Health Record (EHR) system and to gather ideas for future improvement. For the design of our case study, we considered four components affecting service experience [13]: (a) service customers, (b) service

---

[1] Corresponding Author: eunji.lee@sintef.no

workers, (c) service setting, and (d) service process. Table 1 shows the definitions of the four components and the related data collecting activities of our case study.

Table 1. Four components affecting service experience and data collecting activities

Components	Definitions by Fisk et al. [13]	Workshop	Data collecting activities
(a) Service customer	The persons receiving the service	W3-2	Focus group with the EHR users
(b) Service worker	Those who interact with the customer and contribute to the service delivery	W2-2	Focus group with the employees of the EHR producing company
(c) Service setting	The environment in which the service is provided to the customer	W3-1	Usability test with the EHR users
(d) Service process	The sequence of activities necessary to deliver the service	W1 W2-1 and W3-3	Observation of a user consultant Visualisations of the service processes

In August 2014, the first workshop workshop (W1), involving two researchers and two employees from the EHR system producing company, was held as an opportunity for the researchers to learn about the message exchange module in the system. First, an EHR *user consultant* gave a presentation about the module: how does it work; who are the users; how is it used; and what are the challenges. A demo session by the consultant and *observation* of the various uses of the module were followed later. Based on the materials collected from W1, including the presentation file, observer notes, and other relevant documents, the researchers visualised some expected service processes and a scenario-based service process using a service design technique called Service Journey Modelling Language (SJML) [14]. The visualisation of the expected service processes consist of touchpoints, actions, and decision points, showing possible ways of using the module. The visualisation of the scenario-based service process presents touchpoints, actions, and interactions of different actors based on a hypothetical scenario.

The second workshop (W2) was held in October 2014 with the secondary service workers (*employees of the EHR system producing company* with various backgrounds) including the manager, developers, interaction designer, and consultants for nurses and doctors. First, both the *visualisations of* the expected and the scenario-based *service processes were presented* to the secondary service workers (W2-1). The *secondary service workers discussed* problems of current use and suggested improvement during a focus group (W2-2). In our case (eHealth context), the service worker is the message exchange module in the EHR system. Thus, people involved in producing and maintaining the message exchange module become the secondary service workers.

The third workshop (W3) was held in November 2014 with the service customers (*users of the EHR system*). The workshop consisted of three sessions, a usability test (W3-1), focus group (W3-2), and visualisation (W3-3). We recruited users with various backgrounds, who represented different user groups, including a medical doctor, a psychologist, a clinical advisor, a technical advisor, and five health secretaries. The participants were divided into two groups for the group activities. For the *usability test*, the *service customers* were given a set of tasks related to the use of the module (W3-1). One participant from each group was selected to solve some tasks by using the module in the service setting. The other group members watched this on a big screen and wrote their comments about the tasks on an evaluation sheet. The *service customers* then *discussed* how and why they usually work with such tasks in these particular ways, and problems they experienced in the service setting (W3-2). Lastly, each group was given a scenario with three tasks (W3-3): describe the current situation, evaluate emotional aspects of the situation, and propose future solutions. They used Service Journey Cards (SJC), a touchpoint card set from AT-ONE methodology [15], supplemented with

eHealth-specific and emotion evaluation cards, to *visualise* the current and future *service processes* from the service customers' perspectives (e.g. Figure 1).

Figure 1. A future service process of arranging an emergency meeting for an urgent operation.

In addition to the four components, we considered three extra components: (e) service objective, (f) service interaction type, and (g) sub-service provision context. Service objective means the purpose of using the service. The purpose of using the message exchange module was efficient communication among the healthcare professionals and it was pursued as a goal during all the data collecting activities. Service interaction type indicates the type of interactions happening during the service process. The service interaction type of the message exchange module was human to computer interaction, thus to collect data, we used Human Computer Interaction (HCI) methods: observation, focus group and usability testing. In a broad perspective, a service consists of several sub-services. The sub-service provision context of the message exchange module was the EHR system (service worker) provides e-services to the healthcare professionals (service customers). This context was treated as the context for the focus group discussions, usability test, observation, and visualisations.

3. Results

A service does not exist without customers. Involving service customers in service design process is especially important, because a certain degree of customer participation is required to deliver a service [6]. eHealth services often include different groups of service customers, because they inherit the characteristic of existing health services, which is domain specific and includes diverse specialists. Each customer group has different needs and expectations [6]. Involving different types of *service customers* during design process of eHealth services is therefore essential to encourage the service customers identifying problems with the current service and to facilitate suggestions for service improvement from the service customers' point of view.

Including *secondary service workers* in design process of eHealth services is needed, because they interact with service customers indirectly, thus participating in the service process. eHealth services can involve diverse groups of secondary service workers. Facilitating co-creation in groups of representatives of all stakeholders is a central part of service design and core aspect of design thinking [6]. Thus, involving secondary service workers with different backgrounds will support discussion of current service problems and future solutions from the service providers' point of view.

The problems and challenges of the current service can only be observed and collected appropriately in the real service settings. Involving service customers and

obtaining their opinions in the real service settings is therefore preferable. Since EHR is handling sensitive patient information, the researchers had no access to the system in use. In addition, the usability testing was held in a test environment, which was not exactly the same as the real environment.

In the design of a service, considering the service process is vital, because it can affect the mood of customers [6]. Process-oriented approaches are suitable to illustrate series of related interactions in service processes. There are several process-oriented techniques in service design, such as visualisation techniques and prototyping techniques. The visualisation techniques include service blueprint, storyboard, and customer journey map, while the prototyping techniques include desktop walkthrough and role-play. Desktop walkthrough and role-play often require workshop settings and documenting of the results can therefore be challenging. Service blueprint does not seem to provide formats where the relationships between actors can be presented clearly [14]. Even though both storyboard and customer journey map seem better for describing the full scale of service processes [16], storyboard might be time consuming to illustrate all the detailed situations in a sequence. We decided to apply customer journey mapping-based techniques, Service Journey Modelling Language (SJML) and Service Journey Cards (SJC) for our case study. In addition, we used methods from HCI: observation, focus group, and usability testing. SJML was used to describe both expected and current service processes after the observation. The visualisation results were used to analyse the current service process and facilitated a discussion for future improvement from the perspective of the secondary service workers. The secondary service workers participated in workshop W2-2 stated that SJML showed the complex service process in a more understandable way, so it might be useful as a training tool for new service customers or as discussion material for improvement inside the company. A usability test and a focus group were implemented with the service customers. The participants were asked to solve tasks in the surrogate service setting. The SJC were used for the service customers as an innovative way of visualising and discussing the challenges of the current service processes and future solutions. The participated service customers in the workshop W3-2 said that using SJC was fun.

4. Discussion

Designing an eHealth service can be challenging due to the complexity in the service process involving technologies and the number of different stakeholders who are involved in the process. To solve this challenge, we used two service design techniques, SJML and SJC, together with other HCI methods in our case study. SJML showed an overview of a service process for each stakeholder and SJC enabled participants from various user groups to construct service processes. Using combination of these service design techniques enabled us to identify the problems and challenges with the current service processes and discuss solutions for the future service processes from both the service customers' and service workers' point of views.

The results from our case study present how a service design thinking approach was applied for specification of an existing and new eHealth service in a design project by using appropriate methods and techniques considering the seven components affecting service experience: service customers, service workers, service setting, service process, service objective, service interaction type, and sub-service provision context. The findings from our study suggest that SJML and SJC offer effective ways

of engaging stakeholders, in particular when analysing existing eHealth service processes and facilitating discussions for future eHealth service processes. Involving all key stakeholders is fundamental for the success of design projects [17]. To make sure efficacy of design interventions in healthcare, local interpretation of research evidence and guidelines by all key stakeholders is vital [11]. When co-designing a service with stakeholders, detailed analyses of problematic situations and proposed interventions are required to tackle the complexity of the target service [18].

Future research should look at how to engage stakeholders who cannot participate in a workshop setting. Software tools that support visualisation of service processes in a remote environment can be a solution for this. Observational studies could be conducted to measure the stakeholders' online engagement.

Acknowledgement

References

[1] V. Della Mea, What is e-Health (2): The death of telemedicine?, *J Med Internet Res.* **3**(2) (2001).
[2] B. Kaplan, P. F. Brennan, A. F. Dowling, C. P. Friedman, V. Peel, Toward an Informatics Research Agenda, *J Am Med Inform Assoc.* **8**(3) (2001), 235–241.
[3] B-T. Karsh, Beyond usability: designing effective technology implementation systems to promote patient safety, *Qual Saf Health Care*. **13**(5) (2004), 388–394.
[4] C. Pagliari, Design and Evaluation in eHealth: Challenges and Implications for an Interdisciplinary Field, *J Med Internet Res.* **9**(2) (2007).
[5] M. Abouzahra, Causes of failure in Healthcare IT projects, *The 3rd International Conference on Advanced Management Science (ICAMS 2011)* **19** (2011), 46–50.
[6] M. Stickdorn, J. Schneider, *This is service design thinking*, Wiley, 2010.
[7] H. Cottam, C. Leadbeater, *RED paper 01: Health: Co-creating services,* Design Council, London, 2004.
[8] R. Murray, C. Burns, C. Vanstone, J. Winhall, *RED Report 01: Open Health*, Design Council, London, 2006.
[9] E. Kolterjahn, Å. Adolfsson, S. Holmlid, The dilemma of the care recipient, *Touchpoint* **1**(2) (2009), 90–93.
[10] D. Szebeko, Co-designing services in the public sector, In: *Design for Services*, Gower Publishing, pp. 42–52 (2011).
[11] V. L. Carr, D. Sangiorgi, M. Büscher, S. Junginger, R. Cooper, Integrating Evidence-Based Design and Experience-Based Approaches in Healthcare Service Design, *HERD.* **4**(4) (2011), 12–33.
[12] J. Blomkvist, Prototype Evaluation in Service Design a Case Study at an Emergency Ward, *The 4th World Conference on Design Research (IASDR2011)* (2011), 1-11.
[13] R. Fisk, S. Grove, J. John, *Services Marketing: An Interactive Approach*, Fourth ed. Cengage Learning, USA, 2013.
[14] E. Lee, A. Karahasanović, R. Halvorsrud, A Visual Language for the Modelling of Service Delivery Processes to Support Business Processes Management, *International Journal On Advances in Software* **8**(3/4) (2015), 288–308.
[15] S. Clatworthy, Service innovation through touch-points: Development of an innovation toolkit for the first stages of new service development, *Int J Des.* **5**(2) (2011), 15–28.
[16] F. Segelström, *Visualisations in Service Design*, Linköping University, Linköping, 2010.
[17] M. J. Polonsky, A. M. Smith, M. Fischbacher, New service development: a stakeholder perspective, *Eur J Mark*. **39** (9/10) (2005), 1025–1048.
[18] A. Altuna, G. T. Jun, The Applicability of Online Communities in Health Service Co-Design, *The 4th Service Design and Innovation conference (ServDes2014)* (2014), 323-332.