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Simonse, LWL; Albayrak, Armagan; Starre, Susan

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## Patient journey method for integrated service design

Lianne Simonse , Armağan Albayrak  and Susan Starre

Smart Care Lab, Industrial Design Engineering Faculty, Delft University of Technology, Delft, Netherlands

### ABSTRACT

In this article, we focus on the design method of mapping the patient journey in order to support the inclusion of the patient perspective into care service innovations. Increasingly, designers in health use the patient journey approach, however, its method is relatively poorly documented. To ground the activities of the patient journey method, we conducted an in-depth case study of integrated service design with impact on improved patient satisfaction – the case of gastrointestinal diagnose service with video endoscopy technology. The results revealed four distinct activities of the patient journey method: (1) Analyse the care service system; (2) Experience the journey yourself, observe and sketch it; (3) Co-design the patient journey: craft the journey toolkit, interview and synthesize; (4) Evaluate the patient journey for integrated service design.

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patient journey; service design; video capsule endoscopy; design methodology; patient satisfaction

## Introduction

As healthcare is becoming more patient-centred, hospitals are changing the ways in which they deliver care (Ekman et al. 2011). The personal needs of the patients require them to innovate and change their services (Chamberlain and Craig 2017). For instance, patients want to become more involved in decisions regarding their own health (Ekman et al. 2011; Kennedy, Rogers, and Bower 2007; Carroll and Rosson 2007) and, due to their use of information and communication technology, expectations are changing regarding the services of care that they want to receive from healthcare professionals (Wildevuur and Simonse 2015). Research has found that patient engagement and the attention for patients' expectations are important for their healing process and that improvements in person-centred services benefit both patient and hospital (Heckemann et al. 2016). In connection to the shift towards a person-centred perspective, more

**CONTACT** Lianne Simonse  [L.W.L.Simonse@tudelft.nl](mailto:L.W.L.Simonse@tudelft.nl)  Smart Care Lab, Industrial Design Engineering Faculty, Delft University of Technology, Landbergstraat 15, 2628 Delft, Netherlands.

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collaborations with designers and an increased interest in user-centred design approaches can be seen (Wildevuur 2017). To keep healthcare viable, integrated approaches for applied internet technologies and serviced design are needed that take the patient perspective into consideration (Sun et al. 2014; Oosterholt et al. 2017; Griffioen et al. 2017).

In this article, we focus on integrated service design and in particular on the approach of patient journey mapping in order to support the inclusion of the patient perspective into care service innovations and improvements. Our aim is to contribute with a method description of patient journey mapping. As in the current design and health literature the importance of the patient journey is identified (Layton, Moss, and Morgan 1998; Farquhar et al. 2005; Bate and Robert 2006; Trebble et al. 2010; Reay et al. 2017), however, its method is relatively poorly documented.

Therefore, this article describes the patient journey method for service design, grounded on the in-depth case study.

In the next two sections, the theoretical background and inductive case method are further explained. Then, the patient journey method is presented, as the result of the induction, followed by the discussion section.

## **Theoretical background**

Research has shown that the implementation of digital innovations with highly advanced technologies often lacks a patient and service perspective (Wildevuur and Simonse 2015). Such innovations employing digital healthcare technologies regularly suffer from an overemphasis on the technological and clinical possibilities, without taking into account the impact on the patient. As a result, these promising innovations lead to low patient satisfaction (Wildevuur and Simonse 2015). Smart innovation options relying on advanced multimedia technologies have had long research and development trajectories to reach a clinically proven state of feasibility. Such medical-engineering approaches with advanced technologies often lack a patient perspective and integrated service design (Griffioen et al. 2017).

### ***User-centred perspective in integrated service design***

The user-centred perspective has driven design for many years (Mitchell 1993; Desmet and Hekkert 2007; Sanders and Stappers 2012; Newbery and Farnham 2013). More recently, particular attention has been paid to user and customer experiences in relation to service propositions: with customers interacting with organizations through myriad touch points in multiple channels and media (Zomerdijk and Voss 2010; McColl-Kennedy et al. 2015; Lemon and Verhoef 2016). Organizations able to skillfully manage the entire experience create performance impacts of higher customer and employee

satisfaction, increased revenue and lower costs. (Rawson, Duncan, and Jones 2013). In these changing times, it is important for hospitals to consider their current service propositions and improve them, harnessing the advanced possibilities of digital technologies. Hospitals have both the intention and willingness to collaborate with designers, but there are boundaries and challenges for collaboration due to differences in culture and approaches (Reay et al. 2017). In order to overcome these, an integrated approach is beneficial. User-centred service design is such an approach that can not only be used for person centred care experience but can also identify current problems for improved pathway design and new service delivery (Bate and Robert 2006; Mould, Bowers, and Ghattas 2010; Oosterholt et al. 2016).

Mitchell (1993) introduced experience design by reviewing user-responsive design methods and introducing new methods such as shadowing, camera journals, narration, diary writing and drawing the experience (Mitchell 1993; Sanders and Stappers 2012; Newbery and Farnham 2013). Desmet and Hekkert (2007) distinguish the aesthetic experience, the experience of meaning, and the emotional experience. Good service design includes deconstruction of services in terms of aesthetics, meaning and emotions. Furthermore, good design research is considered to be research that brings tacit knowledge to the surface (Sanders and Stappers 2012). Experience in the context of healthcare services is best observed from close and direct personal and face-to-face contact with the patients (Layton et al. 1998) rather than indirect quantitative research of for instance questionnaires on patient perceptions or attitudes (Bate and Robert 2006). The objective of this research is to gain more insights into the particular design method of patient journeys that provides a baseline for mapping experience of patients that undergo a hospital service.

### ***Patient journey mapping***

A way to get started with service design from a user-centred perspective is to employ the technique of the customer journey map (Stickdorn and Sneider 2012; Boeijen et al. 2014; Kimbell 2014; Monninkhof and Simonse 2016). A customer journey is a graphic representation of the stages a customer goes through while experiencing the use of a product or service, and it facilitates gaining insights into all the stages (Stickdorn and Sneider 2012; Boeijen et al. 2014; Kimbell 2014). The knowledge gained from a customer journey can help the designer to design products and services that optimize the experience and generate value for both the user and the organization providing the service. One of the advantages of journeys is that you look at the entire picture instead of focusing on singular touchpoints, which is necessary to understand the overall experience (Rawson, Duncan, and Jones

2013). Only a few studies have identified the emerge of the patient journey (Layton et al. 1998; Farquhar et al. 2005; Bate and Robert 2006; Trebble et al. 2010; Reay et al. 2017). We synthesized their findings and define a patient journey as a comprehensible representation of a health service and its procedures, including relationships and feelings from a patient perspective. The different actors that the patient meets during his/her journey are part of the patient journey and their interaction is described in the service touchpoints. Redesigning these touchpoints can play a key role in improving the selected healthcare service. To date, less framing and in-depth understanding on the emerging phenomenon of patient journeys exist.

### **Research aims and questions**

Although an increasing number of designers in the healthcare domain use the patient journey technique, its method and approach are relatively poorly documented. Overall, there is a lack of understanding on the service design context and purpose, the viewpoint and perspective for analysis of patient experiences, and the journey technique of mapping and visualizing the experience. In this paper, we investigate the patient journey technique for service design, grounded on an inductive case study. For the purposes of describing the method, we asked the following questions:

- How is the viewpoint and perspective of patients researched and analysed?
- How is a journey mapped and visualized?
- How is a journey related to integrated service design?

### **Research methodology**

To answer the research questions, this study uses an inductive case study methodology (Eisenhardt 1989). To uncover and ground the patient journey method, the inductive case study is most appropriate.

### **Context**

Video Capsule Endoscopy (VCE) was selected as the case, as it represents the introduction of advanced technology with a clear problem of low patient outcomes and a design challenge of integration into a complete healthcare service. VCE is a highly advanced diagnostic technique used by gastroenterologists, available in more than 80 countries, and with approximately 1.8 million ingested VCE capsules (Whitmer et al. 2013). The VCE product consists of four main modules: a capsule with camera, a recorder and a workstation. The video capsule makes it possible to view the small

intestine. Although VCE leads to highly advanced clinical diagnosis of stomach, intestine and liver diseases it also requires patients to stay a whole day in the hospital with ‘nothing to do’ and no access to personal mobile phones and any other digital device. The broader context of technology use, of actually generating and implementing a new health service design, had not been taken into account, yet. The hospital context of our case is a tertiary teaching hospital located in Rotterdam, the Netherlands. It is an average-sized hospital with 600 available beds on the wards, approximately 500,000 patients (both in- and outpatient admissions) and 30,000 day-care admissions. The services the hospital provides range from basic care to a number of clinical and special functions for complex care. It is a top clinical hospital in the Netherlands and engages in innovative research to stay ahead in its specialty. It was one of the first hospitals to embrace the technology innovation of VCE. As part of its mission ‘to improve the quality of life of patients’, the hospital sought to accommodate patients’ needs by (re-)designing its service provision.

The medical staff at the case hospital had noticed the problem of low patient satisfaction. The voice of the patients had been absent in the implementation of the highly advanced technology in the VCE. Their experience of the advanced diagnostic service had been unexplored in the broader context of providing a new advanced healthcare service.

### **Research method**

We collected data through desk study, observations and semi-structured interviews. The observation, journey map and interview data were gathered between 24 May and 26 August 2017. Interviews have been used to obtain deep insights into the feelings of the patients. This yielded unique information, as the interviewers had the possibility to react to the answers and probe deeper (Sanders and Stappers 2012). To use time effectively and ensure consistency in all interviews, making data relevant and easier to compare, an interview guideline was used (Patton 1990), based on literature review and earlier observations of VCE.

The sample of the research includes 11 patients for the analysis and design of the journeys. Each patient perspective adds to a better understanding and uncovering of aspects or either confirms or disconfirms experience elements of the service occurring at multiple levels.

Table 1 provides the inclusion and exclusion criteria that had been taken into account in selecting persons for participation in the study. Table 2 shows the sample of participants. Patients were interviewed before the VCE procedure (up to 2 days up front), on the day VCE took place, and after the VCE procedure (after receiving the result from the doctor). Two interviews

**Table 1.** Sample inclusion and exclusion criteria.

| Inclusion criteria  | Exclusion criteria  |
|---|---|
| 1. Available at the case hospital and volunteering to participate | 1. Not volunteering to participate  |
| 2. Standard VCE, non-clinical patient                             | 2. Hospitalized patients during VCE because of heart problems, diabetes etc. (exceptions).  |
| 3. Adult (21–80 years old).                                       | 3. Children. Although VCE is occasionally used for children, we expected they would most likely have a very different experience. |
| 4. Treatment at the case hospital                                 | 4. Under treatment elsewhere.   |

**Table 2.** Sample overview of participants in the research.

| Group              | Moment   | Location/contact  | Gender | Age | Treatment |
|--------------------|----------|-------------------|--------|-----|-----------|
| Patient            | Up front | E-mail            | Female | 24  | Internal  |
| Patient            | Up front | E-mail            | Male   | 32  | Elsewhere |
| Patient            | Up front | At home           | Female | 67  | Internal  |
| Patient            | During   | Hospital          | Male   | 57  | Internal  |
| Patient            | During   | Hospital          | Female | 33  | Internal  |
| Patient            | During   | Hospital          | Female | 66  | Elsewhere |
| Patient            | During   | Hospital          | Female | 63  | Elsewhere |
| Patient            | During   | Hospital          | Male   | 73  | Internal  |
| Patient            | During   | Hospital          | Male   | 55  | Elsewhere |
| Patient            | After    | Hospital          | Male   | 49  | Internal  |
| Patient            | After    | Hospital          | Female | 68  | Internal  |
| VCE nurse          |          | Hospital          | Female | 47  |           |
| VCE nurse          |          | Hospital          | Female | 58  |           |
| Specialist         |          | Hospital          | Male   | 64  |           |
| Team leader        |          | Hospital          | Female | 39  |           |
| Department manager |          | Hospital          | Male   | 46  |           |
| VCE nurse          |          | Academic hospital | Female | 45  |           |

were carried out via e-mail and the others were conducted face-to-face. Although focused predominantly on the patient perspective, the research also involved three nurses, a team leader, a manager and a gastroenterologist. This selection was based on interest in the research and the time available for participation. In total, this adds up to 17 conducted interviews. All interviews were recorded and transcribed.

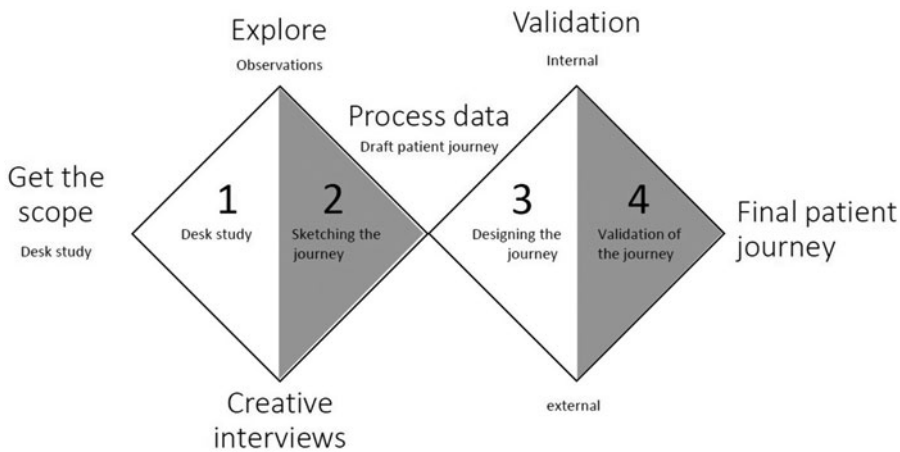
In the last part of the inductive case study, we reflected on the implications for the design methodology by unravelling the patient journey mapping process.

In the next section, we summarize our findings on the design method of patient journey mapping.

## Results: patient journey method

As a result, we framed the journey mapping process according to four distinct versions of the journey artefacts that were created: (1) the VCE protocol overview; (2) the sketch of the patient journey; (3) the designed patient journey; and (4) the validated patient journey. In congruence, we distinguish four main activities of divergent and convergent thinking as shown in





**Figure 1.** Process framework for the patient journey method.

**Figure 1.** The first activity includes a desk study on the clinical protocol or procedure. The second includes role-playing and multiple observations for sketching the journey. Then, in the third activity, the actual grounding of the voice of the patient can start with well-prepared interview protocols and toolkits, after which in the fourth activity the draft journey can be validated by the perspectives of other service stakeholders.

The process framework of the patient journey method is built upon four distinctive design activities:

### **Analyse the care service system: desk study**

To gain an overview of the service, the context of the use of the technology, the clinical protocol, the process, the organization(s) and strategy were explored. The whole service system, in our case the VCE diagnosis of gastrointestinal disease, had been taken into account by means of collecting all available patient information (including digital communications), literature about the (VCE) procedure/protocol and internal strategy and organization documents. Based on this, the main journey activities were plotted on a timeline (see [Figure 2](#)). As the starting and end point, respectively, the moment when a patient starts coping with an undiagnosed disease and the moment when the patient receives the result of the VCE procedure were defined. On the process axes, six key activities were defined.

Our desk research further revealed that the research literature on video capsule endoscopy had been primarily focused on technical functionalities such as enabling a larger view, higher frame rate, etc. (Whitmer et al. 2013; Hale, Sidhu, and McAlindon 2014; Keuchel et al. 2015).



### ***Experience the journey yourself, observe and sketch it***

To get a deep understanding of the expectations and experience of the service ourselves, the principal designer set out to observe the service providing while ‘placing herself in the shoes of a patient’. On 2 days, she made observations when she joined two nurses during their work and documented all, including notes about similarities and differences in the nurses’ contact moments with patients, in a notebook. In this way, she captured the interactions from a nurse care provider perspective. To capture the patient perspective, the designer joined on three occasions a patient ‘undergoing’ the whole-day VCE procedure from beginning to end. All these observations were visually translated. Simple drawings and icons were used to immediately identify activities and interactions. Based on all these observations, the designer made a first sketch, setting a baseline for the patient journey with different layers of time, activities, location and roles visualized (see [Figure 3](#)).

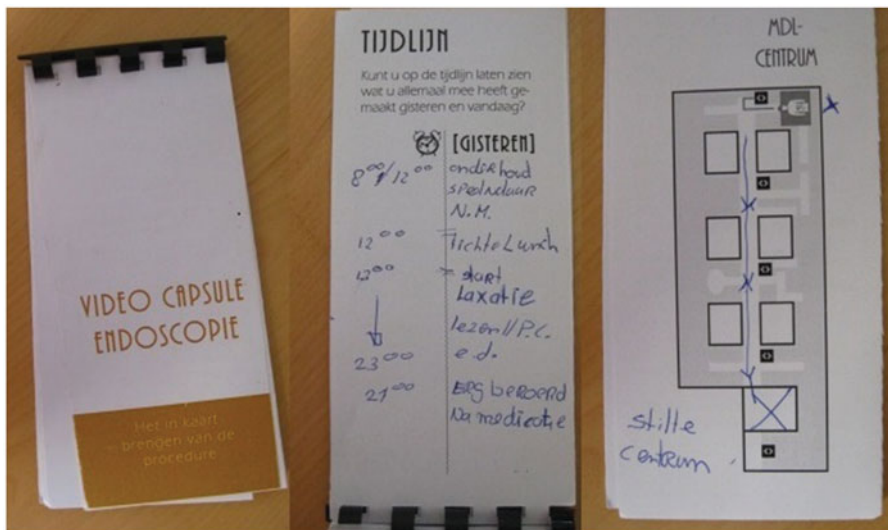
The sketch defined the fundamentals of what is happening, at what time, where and who is involved. The timeline is used to indicate the length of activities and non-activities in particular in this case, as patients had to spend much time on their own in the hospital. The specific locations of patient stay at the hospital were also included in the drawing.

### ***Co-design the patient journey: craft the journey toolkit, interview and synthesize***

Based on the results of the sketch, the patient journey toolkit with interview guides and a sensitizing booklet were crafted.

We compiled the booklet with questions and visuals about activities the day up front and ‘today’, moments that were comfortable and uncomfortable, with whom the patients had had contact, where they stayed in the hospital, and questions regarding their experience (see the illustration in [Figure 4](#)). In preparation for the interview, the patients were given this booklet to fill in and return at the interview. Part of the interview guides consisted of a schematic patient journey with the following characteristics: blank space for filling in the time, location, procedure, way of contact, who and particularities. During the interview, the designer mapped the personal patient’s journey of the interviewee on this timeline.

With this toolkit material, we were able to collect more in-depth data. We conducted interviews for each part of the journey. Photos were taken from the personal patient journey map of each interviewee and all interviews were transcribed. Then each transcript was read several times to gain familiarity with the data and to find similarities and differences on activities and interactions. From this data, a draft patient journey was designed and visualized. Three experiences of the patients were compared. Quotes were



**Figure 4.** Images of the sensitizing booklet.

extracted from the booklets, transcripts and the personal journey maps. Conclusions were drawn with regards to commonalities in how patients feel during certain activities and what the problems and options are for improvement and innovation.

This draft design of the patient journey maps the sequence of the activities of the VCE diagnosis service: arrival of the patient at hospital, connecting the patient and swallowing the capsule, walking, checking the capsule: has it reached the stomach, free time, drink moment, free time, drink and eat moment, free time, disconnecting the patient and then allowing the patient to go home. Photos were used to show the different locations within the hospital.

This second patient journey design evolved with iteration, with different pieces of information being added. For this version, a more sophisticated visualization application, such as InDesign, was used to make the patient journey clearer and the text easier to read and ensure proportional time distribution.

### **Evaluate the patient journey for integrated service design**

The final version of the patient journey was designed after several validation discussions, first with the patients involved and then with the care providers, the nurses on duty, the team leader and the department manager. During the discussions, the designed version of the patient journey was shown to stimulate feedback, validate the insights and improvement options. Based on this, the validated journey was designed (see [Figure 5\(a,b\)](#)).

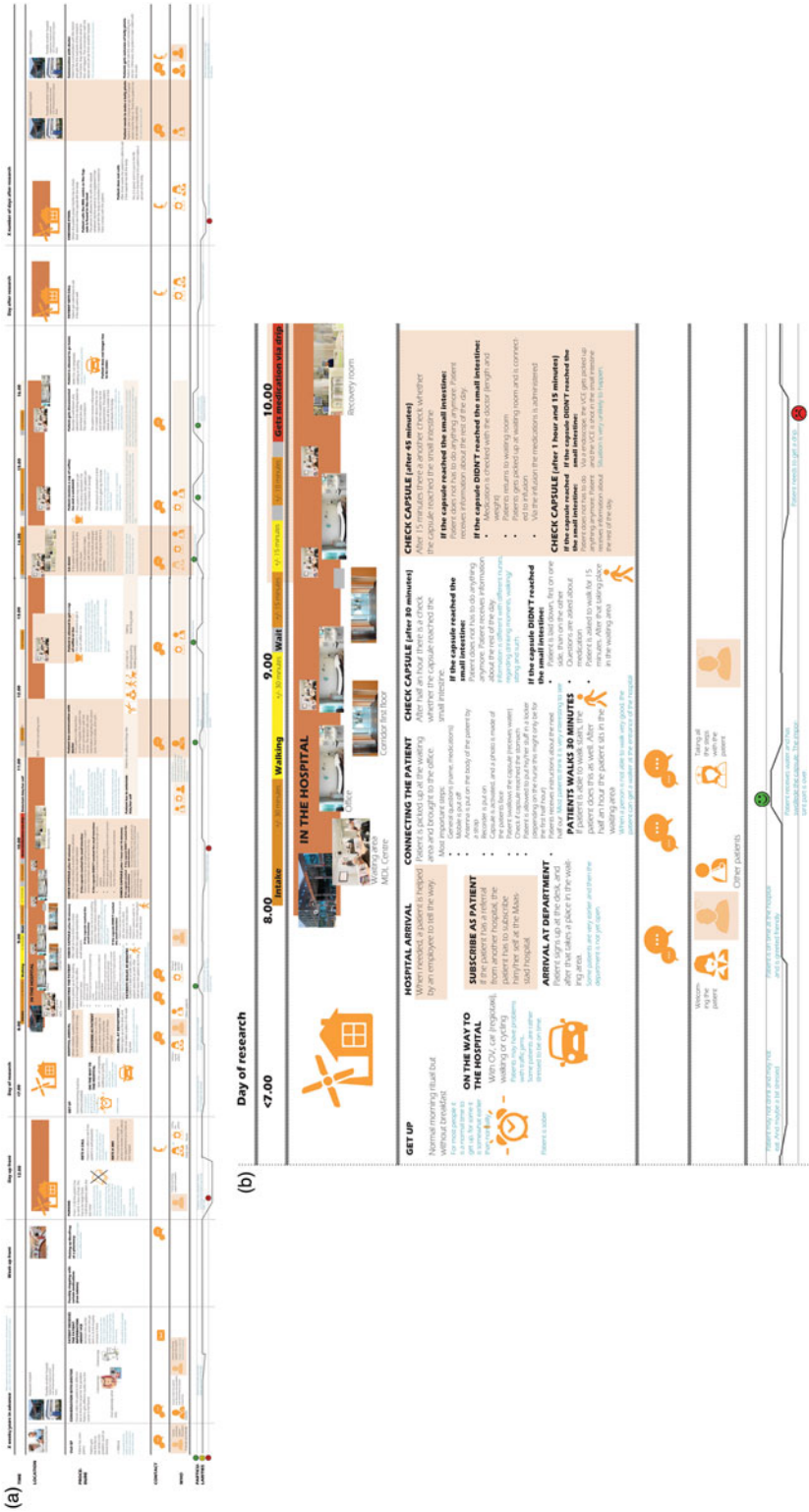


Figure 5. (a) Validated patient journey, total picture. (b) Validated patient journey, zoomed in.

With additions of a top layer timeline that details how long every service activity takes and clearly defines the parts where people had nothing to do. And, an addition of the bottom layer: an emotional line of the experience of the service, giving a clear view of what patients liked and disliked. The peaks indicate the areas of improvements and positive areas to preserve in the (VCE) service provision. Based on that, we formulated the design specifications for integrated service design.

In this last iteration, an external, as well as an internal evaluation, was carried out. For this, an extreme case was selected in which the patients were allowed to go home during the day. Service documentation and an interview with a nurse from another hospital were used. In addition, differences between the hospital organizations were recognized and taken into account. This led to adding, removing and detailing certain text or person icons in the patient journey design. The end version of the validated patient journey was used for the integrated service design, the new service proposition.

## Discussion

The design artefacts of the patient journey created a holistic overview of the service providing related to a certain clinical procedure or protocol. We reflected on the case with our double loop learning on the process of patient journey mapping and compare it to the process aspects in the literature (Layton et al. 1998; Farquhar et al. 2005; Bate and Robert 2006; Trebble et al. 2010; Reay et al. 2017).

When we compare the journey processes framework in [Figure 1](#) to the case described by Reay et al. (2017), the iterative process of diverging and converging clearly corresponds with their approach of mapping the patient journey. Their descriptions of secondary and primary research are equally similar to the first two steps of the process framework. The third and the fourth step are nearly similar capturing the activities: insights, ideate and make/test. The difference is that we zoom in on the particular elements of activities of patient journey mapping.

Furthermore, we revealed from all reflections on the case and the comparison with literature, two principal guidelines.

### *Patient viewpoint: role play and co-design with multiple patients*

Given that every patient has his or her own journey, mapping the journey of a procedure should include insights from multiple patients. It is important to involve as many as possible to understand what patients often experience in similar ways and what not, and which steps are uniform and which ones are unique. Multiple patient involvements make the journey more robust, enabling the illustration of a range of variation. For grounded results with

respect to the voice of the patients, interviews with actual patients are therefore absolutely necessary. In the first 'design diamond' of the framework, the role-playing by the designer and the inclusion of the perspective of a nurse are the representations of the patient's voice. Through this technique of empathizing with the patient's situation, it becomes possible to craft a sensitizing booklet and interview protocol that touch upon the deeper level of emotions and experience, which are needed in the second 'design diamond'.

### ***Journey mapping and relation to service design***

We showed that different versions of visualizing the patient journey create valuable insights regarding a service and point out different details for improvements. Through journey mapping and visualization, a holistic overview of the (VCE) procedure is created and the service design specifications are identified. The visuals can inspire employees to rethink the way they currently handle certain activities, inspiring them to change certain communication aspects and touchpoints. Using a map that shows a representation of the entire 'picture' can enable discussions between stakeholders. Involving more than one person in the validation results in effective problem solving and a shared view on integrated service design. Having this commonly shared insight yields strong and effective design directions for the improvement of patient-centred service delivery. As the follow-up of service design involves different types of stakeholders, it is important to include them upfront in the journey validation.

### ***Limitations and future research***

The patient journey we described is a design method that makes use of specific design techniques of role play, visualizations, sensitizing booklets and interview protocols that are closely related to qualitative research methods. Limitations of this type of research concern the sample size, that is viable for the hospital involved and the wider population of VCE patients, but the presented patient journey does not allow for drawing broader inferences for wider populations (Silverman 2011). This in contrast to our reflective process on the learnings on the patient journey method forms the case. Concerning this reflective process, we limited our research to the inclusion of the cases available in the literature. In extension to this, we suggest for further validation of the process framework to devise a mixed method study that also includes non-published cases of patient journey projects. Concerning the next steps of integrated service design, we suggest concentrating further research on the connection of patient journeys to the care model design, which include the perspective of all healthcare providers and hospital employees and their internal interactions in the service pathway.

## Ethics

The research is executed in accordance to the principles of the Helsinki declaration of the World Medical Association (2013) and the Nuremberg principles, checked and reviewed by the human research ethics committee (HREC, <https://www.tudelft.nl/over-tu-delft/strategie/strategiedocumenten-tu-delft/integriteitsbeleid/human-research-ethics/>) of the Delft University of technology. In our sample design, we had excluded the participation of the vulnerable groups of children and elderly above the age of 65 upfront. All methods used were checked and approved by the HREC and the data steward of the Industrial Design Engineering faculty. In addition, the research was approved by the hospital management of the gastroenterology department of the case hospital. The patients were invited to participate in the study on voluntary base. The principal designer introduced the research orally, stressing the person's right to make an own choice to participate.

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## Disclosure statement

No potential conflict of interest was reported by the authors.

## Notes on contributors

**Dr. Lianne Simonse** researches Care model design for eHealth and teaches Strategic Design students at the faculty of Industrial Design Engineering of the Delft University of Technology on how to employ scientific research methods along the participation in her research program in the domain of design for health. Together with Armağan Albayrak, she established the Smart Care lab. Her contribution to this project consisted initially of chairing and coaching the strategic and scientific aspects of an integrated service design approach, and later on, editing and co-writing the article versions of the case description.

**Dr. Armağan Albayrak** teaches patient journey mapping with the MOOC that she developed at the Faculty of Industrial Design Engineering of Delft University of Technology together with the Medisign staff. Her research program is dedicated to design for healthcare in the area of integrated product design, ergonomics, biomechanics and user research. She established the Smart Care lab together with Lianne Simonse. Her contribution to this project consisted of coaching and reviewing the design research approach for the patient journey mapping, and reviewing and co-editing the case description.

**Susan Starre** is a Master of Science in Strategic Product Design. She graduated at the Faculty of Industrial Design Engineering of Delft University of Technology, with a specialty in Medisign. She now works as a medical business analyst at a major health assurance company in the Netherlands. In this project, Susan was the principal designer who



initiated and compiled the project approach for the patient journey mapping. She prepared, analysed and synthesized all journey maps, protocols and booklets. She documented the case and created the first versions of the paper.

## ORCID

Lianne Simonse  <http://orcid.org/0000-0001-8860-6522>

Armağan Albayrak  <http://orcid.org/0000-0001-5801-3670>

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