Reshaping mental models – enabling innovation through service design

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Abstract

Purpose – The purpose of this paper is to analyze how service design practices reshape mental models to enable innovation. Mental models are actors' assumptions and beliefs that guide their behavior and interpretation of their environment.

Design/methodology/approach – This paper offers a conceptual framework for innovation in service ecosystems through service design that connects the macro view of innovation as changing institutional arrangements with the micro view of innovation as reshaping actors' mental models. Furthermore, through an 18-month ethnographic study of service design practices in the context of healthcare, how service design practices reshape mental models to enable innovation is investigated.

Findings – This research highlights that service design reshapes mental models through the practices of sensing surprise, perceiving multiples and embodying alternatives. This paper delineates the enabling conditions for these practices to occur, such as coaching, diverse participation and supportive physical materials.

Research limitations/implications – This study brings forward the underappreciated role of actors' mental models in innovation. It highlights that innovation in service ecosystems is not simply about actors making changes to their external context but also actors shifting their own assumptions and beliefs.

Practical implications – This paper offers insights for service managers and service designers interested in supporting innovation on how to catalyze shifts in actors' mental models by creating the conditions for specific service design practices.

Originality/value – This paper is the first to shed light on the central role of actors' mental models in innovation and identify the service design practices that reshape mental models.

Keywords Innovation, Service design, Mental models, Institutional work, Service ecosystems, Institutional arrangements

Paper type Research paper

Introduction

"If a factory is torn down but the rationality which produced it is left standing, then that rationality will simply produce another factory. If a revolution destroys a systematic government, but the systematic patterns of thought that produced that government are left intact, then those patterns will repeat themselves in the succeeding government. There's so much talk about the system. And so little understanding" (Pirsig, 1974).

Innovation has been conceptualized through a service ecosystem perspective as a process of changing the institutional arrangements that govern the way that value is

cocreated among actors (Vargo *et al.*, 2015). While early research is often interpreted as describing institutional arrangements as external, macro-level social structures (Meyer and Rowan, 1977), recent literature has emphasized that institutional arrangements are not something "out there," but rather constructed by actors' cognitive beliefs (Scott, 1995). As such, there is growing recognition that in order to understand how actors shift existing institutional arrangements, there is a need to focus on the cognition of actors (Suddaby *et al.*, 2016). More specifically, it has been recognized that "institutions clearly are a reflection of evolving mental models" (Denzau and North, 1994, p. 22). In order to shift institutional arrangements, actors must change their mental models – the assumptions and beliefs that guide their behavior and interpretation of their environment (Dequech, 2013). For example, a doctor might have a mental model of the doctor–patient relationship that reinforces that "the doctor knows best" leading them to interact with their patients in a directive way. While mental models are central to innovation from a service ecosystem perspective, they have been largely ignored within service research in recent years (Strandvik *et al.*, 2014).

The service ecosystem perspective enables researchers to have oscillating foci where the phenomenon of interest can be examined at different levels of aggregation by zooming in and out (Chandler and Vargo, 2011). However, research to date on innovation in service ecosystems has mainly focused on a macro-level of aggregation (Vargo and Lusch, 2016; Wilden *et al.*, 2017). Such a focus limits the direct applicability of this conceptualization of innovation for practitioners. A focus on mental models can support the much-needed translation of the service ecosystem perspective on innovation as changing institutional arrangements toward the micro-level of individual actors and groups. An understanding of how to change mental models is critical for service managers interested in driving innovation, especially in contexts where related actors seem to be stuck in the status quo. Without addressing the persistent mental models of actors, service managers may continue to face resistance that significantly impedes innovation within their service ecosystem. In order to enable actors to overcome the status quo, service design has been identified as one promising approach to reshaping mental models (Vink *et al.*, 2017), engaging actors in institutional work (Kurtmollaiev *et al.*, 2018) and catalyzing innovation (Andreassen *et al.*, 2016; Patrício *et al.*, 2011). Service design is recognized as a humanizing, creative and iterative approach to realizing preferred futures (Blomkvist *et al.*, 2010). Foundational to this approach is a set of practices (Karpen *et al.*, 2017) that can that aid actors in reframing how they interpret situations (Dorst, 2011) and trigger changes in actors' assumptions (Wetter-Edman *et al.*, 2018), which are a key component of mental models (Johnson-Laird, 2013). However, to date, there has not been a systematic empirical analysis of how service design practices reshape actors' mental models to enable innovation.

As such, this paper explores the research question:

RQ1. How do service design practices reshape mental models to enable innovation in service ecosystems?

To investigate this, the authors draw on an 18-month ethnographic study of efforts to innovate within the Swedish healthcare system through service design. Informed by observations, informal conversations, interviews and a review of archival data, this approach examines "cognition in the wild," recognizing that cognition is entangled in actors' everyday cultural practices and spans across the inside–outside boundaries of skin and skull (Hutchins, 1995; Hutchins, 2014). Through this rich ethnography, three types of service design practices that contribute to shaping actors' mental models are identified: sensing surprise, perceiving multiples and embodying alternatives.

By focusing on how actors' can reshape mental models, this study has important implications for the literature on innovation in service ecosystems and service design.

First, this research contributes to the service ecosystem perspective of innovation by offering an *in situ* understanding of the micro-level practices that shape mental models and enable actors to alter institutional arrangements. This research explains how innovation emerges and how actors can change their social context by shifting their own mental models. Such a contribution is important because it develops the service ecosystems perspective on innovation to become more actionable. Second, this research advances the literature on service design by delineating how service design practices contribute to reshaping mental models and changing institutional arrangements. This understanding is critical for building the theoretical connection between service design and innovation that has been in need of further development (Patrício *et al.*, 2018). Furthermore, this research offers important insights for service managers and service designers on specific enabling conditions for the service design practices that support the changes in mental models necessary for innovation.

This paper begins by reviewing related theory on innovation in service ecosystems, mental models and service design practices. These threads are then woven together into an integrative conceptual framework that provides the basis for the empirical study. After detailing the ethnographic approach, findings from the fieldwork conducted at Experio Lab, a national center employing service design to support innovation in the context of the Swedish healthcare system, are presented. Through this study, the practices of reshaping mental models through service design and their enabling conditions are identified. This paper concludes by drawing out the implications of these contributions for theory and practice and outlining opportunities for future research in this area.

A macro-level perspective on innovation in service ecosystems
Institutional arrangements
Discourse on service innovation has evolved significantly in the last 20 years with many divergent perspectives on what this concept entails (Witell *et al.*, 2016). One perspective on innovation that is gaining ground in service research is the service ecosystem perspective of innovation, based on service-dominant logic. A service ecosystem is a "relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange" (Lusch and Vargo, 2014, p. 161). The service ecosystem perspective on innovation offers a unified, holistic lens for understanding novel value cocreation (Vargo *et al.*, 2015). It takes a synthesis view of innovation, which encompasses both technical and non-technical activities (Akaka *et al.*, 2017). This perspective is aligned most closely with the systems archetype of innovation, that sees innovation as "a reconfiguration of resources, actors, and institutional arrangements" (Helkkula *et al.*, 2017, p. 7). Institutional arrangements are shared, taken-for-granted knowledge structures or meanings with normative and cognitive underpinnings that support self-reproducing social order (Greenwood *et al.*, 2008). While institutional arrangements are often seen as objective social facts, they are subjectively formed by actors as they construct reality through ongoing social interactions (Scott, 1995). Institutional arrangements enable actors to categorize events, assess their consequences and consider appropriate actions efficiently (Friedland and Alford, 1991). Often referred to as "the rules of the game" (North, 1990) in service ecosystems, institutional arrangements are the glue that holds the current processes of value cocreation in place and have a central role in innovation.

Institutional work
A service ecosystem perspective suggests that innovation happens by actors doing institutional work – intentionally disrupting, creating and maintaining institutional arrangements (Lawrence and Suddaby, 2006). Innovation then becomes an ongoing process

of reshaping the institutional arrangements that guide resource integration practices to enable actors to cocreate value in novel ways (Koskela-Huotari *et al.*, 2016). This perspective emphasizes that innovation is not just an outcome, but a collaborative process of resource integration where actors collectively re-create service ecosystems (Lusch and Nambisan, 2015). Understanding innovation as a change in the structure of service ecosystems through new sets of norms and rules advances a contextual view of innovation that has been missing in previous research (Edvardsson and Tronvoll, 2013). While the perspective of service ecosystems enriches the understanding of actors and innovation in context (Akaka *et al.*, 2017), research on innovation from this perspective leaves questions about the micro-level activities that enable changes in institutional arrangements.

Within the service ecosystem perspective on innovation, the question remains: how are actors able to engage in divergent change while experiencing pressure from existing institutional arrangements (Battilana and D'Aunno, 2009)? Some research suggests the importance of institutional complexity as a driver of innovation in service ecosystems (Siltaloppi *et al.*, 2016). However, it is increasingly recognized that purely structural or macro-level explanations of how actors contribute to institutional change are insufficient because actors' apprehension of institutional complexity is not inevitable (Voronov and Yorks, 2015). To satisfy the phenomenological nature of institutional arrangements, a cognitive explanation is needed (Suddaby *et al.*, 2016). While there has been a lack of research at the level of individual actors (Battilana and D'Aunno, 2009), such research is critical for fully understanding actors' ability to disrupt the status quo within institutional arrangements (Suddaby *et al.*, 2016; Voronov and Yorks, 2015). Despite some promising studies of cognitive aspects of institutional work in service ecosystems (Siltaloppi, 2016), further research is needed to understand how actors can make the cognitive shifts necessary for realizing innovation. As mental models are a cognitive underpinning of institutional arrangments (Denzau and North, 1994), a greater understanding of mental models can help to advance our knowledge regarding the micro-level cognitive changes of actors that enable innovation in service ecosystems.

A micro-level perspective on innovation in service ecosystems
Mental models
Mental models specifically involve actors' assumptions and beliefs about how something works and how to act based on that understanding. A mental model can be as simple as a metaphor that captures the relationship between components of a system, such as thinking about the structure of a family as a tree (Collins and Gentner, 1987). Mental models support actors to reduce uncertainty by acting as heuristics for value cocreation based on past experiences (Prahalad and Bettis, 1986). The shared mental models of actors constitute institutional arrangements (Denzau and North, 1994) and enable these institutional arrangements to become generally taken-for-granted and uncontested (Scott, 1995). Shared mental models allow actors to act in concert and interact effectively (Berggren, 2016). While they are valuable for helping actors deal with ambiguity, mental models can also perpetuate historical institutional arrangements that are no longer helpful (Prahalad and Bettis, 1986). As such, mental models have been identified as a key source of inertia (Guiette and Vandenbempt, 2013), which involves the reduced willingness of actors to cannibalize current ways of operating (Chandy and Tellis, 1998). The long history of research done on mental models in other fields can aid in deepening our understanding of mental models and how they can be changed to enable innovation in service ecosystems.

The construct of mental models had its origins in the logic of Peirce, who talked about reasoning that "put before us moving pictures of thought" (Peirce, cited in Johnson-Laird, 2013, p. 132). It was then later developed through the psychological research of Craik (1943), who suggested that humans carry a small-scale model of reality and possible actions within

their heads. More recently, it has also been recognized that aspects of mental models are distributed within an actor's environment so that an actor does not need to hold everything in their mind (Artman, 1999). In the field of cognitive science, the theory of mental models helps to explain the processes that underly inference, including the rationale for systematic errors (Johnson-Laird, 1980). This theory posits that actors do not comprehend the world directly, rather they employ representations of it, called mental models. The structure of actors' mental models corresponds to the structure of the system being represented (Johnson-Laird, 2013). When individuals reason they draw conclusions that are probable, based on their corresponding models (Johnson-Laird, 2013). These models help to reduce the cognitive load on actors' working memory, enabling inference without the related models necessarily emerging into consciousness (Johnson-Laird, 1980, 2010).

However, mental models are often incomplete and fragmented leading to inappropriate actions. Contributing to errors is the fact that mental models represent what is true at the expense of what is false (Johnson-Laird and Savary, 1999) and that they can be constructed based on descriptions of the world with arbitrary assumptions, rather than direct experiences (Johnson-Laird, 1980). As such, the capacity of actors to draw appropriate inferences relies on their ability to construct, manipulate and refute their existing mental models (Johnson-Laird, 1980, 2010). Research in cognitive science has helped to shed light on some of the intrinsic and extrinsic factors influencing changes in actors' mental models. One significant cause of change in mental models is an actor's detection of an inconsistency (Khemlani and Johnson-Laird, 2013). When an actor reaches an impasse with their existing pattern of inference, they revise their related mental models minimally or significantly, depending on their explanation (Wason, 1964). Other influences on changes in mental models include: emotions, which play a role in determining if conclusions are valid or invalid (Gangemi *et al.*, 2013); framing, as re-descriptions can block unhelpful assumptions and enable alternatives (Murray and Byrne, 2013); diagrams, which can help actors envision other possibilities (Hegarty *et al.*, 2013); and gestures, which reflect mental models and can aid actors' in making corrections (Núñez, 2006). Interestingly, these identified influences on mental models align with some key aspects of service design practices.

Service design practices
Service design is defined as an explorative approach to creating novel forms of value cocreation (Kimbell, 2011). Within the literature, service design is regularly connected with innovation (Andreassen *et al.*, 2016; Sangiorgi and Prendiville, 2015) and increasingly being viewed through a service ecosystem perspective (Wetter-Edman *et al.*, 2018). In this view, service design is positioned as a set of creative practices, supported by methods and tools, that can help to alter service ecosystems toward preferred futures (Wetter-Edman *et al.*, 2014). Recently, service design practices have also been identified as a transformative force for changing institutional arrangements in service ecosystems (Kurtmollaiev *et al.*, 2018). These practices – learned actions and interactions with specific affect patterns manifested in context – are identified as a core foundation of the macro-level changes enabled by the service design approach (Karpen *et al.*, 2017) and have been associated with the process of institutional work (Wetter-Edman *et al.*, 2018). The experiential, reflective and participatory nature of service design practices aid actors in creating the conditions for changes in institutional arrangements (Vink *et al.*, 2019).

Previous research highlights the importance of disruptive aesthetic experiences in sparking the possibility of institutional change through service design practices (Wetter-Edman *et al.*, 2018). Aesthetic experiences involve actors in gaining information about a situation through their sense of sight, sound, taste, touch and smell (Stephens and Boland, 2015). When these bodily experiences, staged through service design practices,

challenge actors' existing assumptions, they have the potential to change actors' mental models (Vink *et al.*, 2017) and enable institutional work (Wetter-Edman *et al.*, 2018). Furthermore, because service design practices bring diverse actors together through co-design, many actors can be exposed to these experiences (Trischler *et al.*, 2018). While service design practices are regularly led by service designers, it is through the often neglected aspect of diverse participation that the process of change in service ecosystems is catalyzed (Holmlid *et al.*, 2017). The aesthetic, reflexive experiences of actors in the co-design process are at the core of how actors work to create the conditions for novel value cocreation through service design (Akama and Prendiville, 2013).

Connecting back to the discussion of mental models, research suggests that service design practices enable cognitive change (Karpen *et al.*, 2017). This process of cognitive change has been linked to framing – the creation of a standpoint from which a situation can be perceived (Dorst, 2011). Framing has also been connected with both actors' ability to alter the institutional arrangements in service ecosystems (Siltaloppi, 2016) and changes in mental models (Murray and Byrne, 2013). Research argues that the cognitive processes of design are not separate from, but intertwined with, its embodied practices (Rylander, 2009). It is by balancing the cognitive, bodily and emotional connections, that service design practices engage actors in a process of change (Karpen *et al.*, 2017). While existing research highlights the possibility of service design to drive cognitive change, empirical research is needed to understand the relationship between the embodied practices of service design and changes in mental models. Below, this existing literature is drawn together into a cohesive framework to provide a foundation for the empirical study.

Conceptualizing the micro-macro relations of innovation in service ecosystems through service design

This paper takes an integrative approach to conceptualization that brings dispersed existent knowledge together into a unified framework (MacInnis, 2011). The conceptual framework leverages the oscillating foci of the service ecosystem perspective (Chandler and Vargo, 2011) to bring together connected concepts. Based on the review of related theory, it is recognized that institutional arrangements, normally examined at a macro-level, are inextricably linked to actors' mental models at the micro-level. Actors' mental models uphold institutional arrangements and institutional arrangements reinforce actors' mental models. As such, there is ongoing interplay between these two concepts as they co-construct and mutually constitute each other. Thus, to realize innovation in service ecosystems through institutional work, actors' must reshape their mental models. Service design practices have been recognized as a means of engaging actors in institutional work and have been linked with changes in actors' mental models. Figure 1 zooms in and out of the innovation process in service ecosystems, showing how reshaping mental models through service design practices at a micro-level can enable changes in institutional arrangements at a macro-level.

For example, based on institutionalized aspects of medical education, regulation and societal norms, a doctor with a mental model that "the doctor knows best" may enact this mental model through directive interactions with patients, further reinforcing the existing institutional arrangements. However, if this doctor engages in service design practices, they may shift their mental model to recognize that "the patient is an expert of their own experience." By changing their mental model, the doctor is then able to see the opportunities and constraints of existing institutional arrangments and may start to intentionally disrupt the traditional professional role of doctors through their interactions with patients and other care team members, as well as advocacy work within their association of physicians. However, understanding the specific service design practices that contribute to reshaping
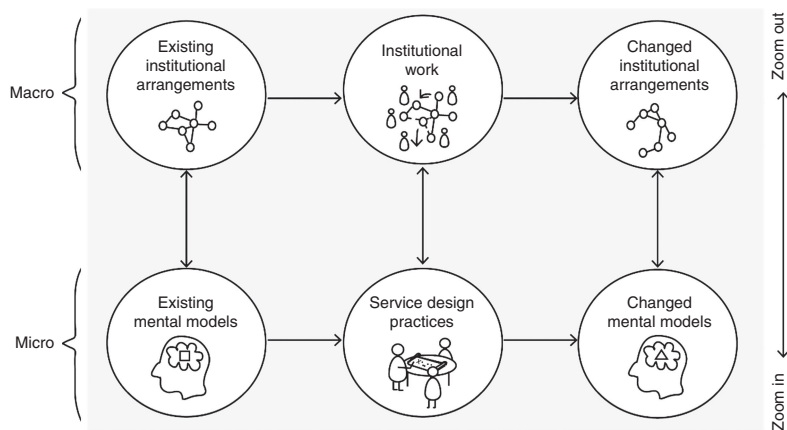
mental models and how they support the innovation process is an unresolved issue. In order to contextualize this framework and illuminate related practices, the ethnographic study is described in the following sections.

Methods
Research design
To understand how service design practices reshape mental models to enable innovation in service ecosystems, an in-depth 18-month ethnographic study of service design practices in the context of the Swedish healthcare system was conducted. Ethnography has a long history of interpreting actors' beliefs in everyday contexts (Frake, 1962) and offers a relevant approach for studying cognition as cognition is itself a cultural process (Hutchins, 1995). Research in cognitive science is increasingly leveraging ethnographic methods to study cognition in everyday life (e.g. Dahlbäck et al., 2013). It is recognized that cognition is not just something that happens inside actors' heads and therefore the unit of analysis must be expanded to account for the fact that cognition is embodied and distributed, making it inseparable from actors' perceptual and motor processes, as well as their physical and social environment (Rogers and Ellis, 1994). As such, the unit of analysis in this study is service design practices, with strong attention to social interaction and contextual factors. This unit of analysis emerged through the "funnel" approach that is characteristic of inductive analysis in ethnographic research (Hammersley and Atkinson, 1995). In this study, data collection began by exploring service design projects within the healthcare system and then slowly narrowed toward service design practices that reshape mental models through a dialectical interaction between data collection and analysis. While the primary focus of analysis was on service design practices, the researchers maintained an oscillating focus to capture related macro-level processes.

As is traditional in ethnographic research, this study combines the methods of participant observation, informal conversations, interviews and archival analysis (Fetterman, 1998). By blending these methods, it is possible to get information about processes that cannot be directly observed (Hammersley and Atkinson, 1995). There is recognition that by examing the interplay between the interpretations of participating actors' and those of the ethnographer, appropriate inferences can be made about processes that are not fully observable. This study employs a para-ethnographic approach in which organizational actors become collaborators in the study – sharing insights, shaping theoretical agendas and engaging in a common analytical exchange (Holmes and Marcus, 2008). Para-ethnography recognizes that some

organizational actors are capable of taking a critical view of the cultures and processes in which they participate, especially those actors with training and knowledge related to ethnographic methods (Islam, 2015). This approach is particularly relevant in the context of this study as many actors were educated as designers with training in ethnographic research as part of their formal education.

Context

This ethnographic study investigates the service design practices of Experio Lab in the Swedish healthcare system. Experio Lab is an initiative that was started by the County Council of Värmland in 2013. Using a multi-disciplinary, participatory service design approach, this initiative brings together staff, patients and their families to re-design healthcare services to improve the patient experience. Similar initiatives that leverage service design in healthcare have been established around the globe (Mager, 2017). Since the time of its initiation, Experio Lab has expanded to six other counties and regions in Sweden. The authors studied the practices of diverse actors connected with Experio Lab projects that ranged from creating a new digital mental health service for youth to re-designing the process of blood and tissue sampling. Because healthcare service ecosystems are highly complex and guided by entrenched, formalized institutional arrangements, healthcare represents an extreme setting for reshaping mental models and enabling innovation (Wang *et al.*, 2015). Empirical research in such an extreme context can help to reveal richer, more generalizable insights that may not have been otherwise visible (Flyvbjerg, 2006). Furthermore, there is also recognition that healthcare is a fertile context for service design (Anderson *et al.*, 2018) and service research more broadly (Berry and Bendapudi, 2007).

Data collection

The primary strategy for data collection was to engage in participant observation, which involves a "process of learning through exposure to or involvement in the day-to-day or routine activities of participants in the research setting" (Schensul *et al.*, 1999, p. 91). The first author of this study was embedded within Experio Lab in the healthcare system for a period of 18 months, which included completing over 400 hours of observations. During that time, the first author took field notes that captured concrete descriptions of actors' processes and their context, first with a wide view and then with an increasing focus on service design practices that reshape mental models. The observation framework can be found in Appendix 1. A second researcher was also involved in observations in the field to a more limited extent, which helped to deepen the understanding of the events that took place by combining interpretations from different perspectives (Erickson and Stull, 1998). Building on the insights from observations, other methods including informal conversations, interviews and a review of archival data were employed to triangulate the evidence gathered (Eisenhardt, 1989). The data from each method helped to illuminate and explain data from the other methods (Hammersley and Atkinson, 1995), as, for example, informal conversations were used to solicit information about actors' thought processes during the service design practices that were observed.

To support this process, 14 semi-structured interviews with Experio Lab team members and healthcare staff were conducted (for the full list of interviews see Appendix 2). These interviews aided in progressively clarifying the focus of the study and developing preliminary inferences about how service design practices reshape mental models. The interview guide can be found in Appendix 3. Interviews lasted between 50 and 90 min. In some cases, follow-up interviews of 20 to 30 min were also conducted with the same interviewee at a later date to clarify meaning or get an update on a project. It is well recognized in ethnographic research that semi-structured interviews can help to clarify the

domain of study and illuminate related concepts (Schensul *et al.*, 1999). The interviewees were strategically selected based on well-established criteria for fruitful informant selection (Dean *et al.*, 1967), which includes a focus on those actors that might be more reflective on the practices they engaged in and willing to share their reflections. Furthermore, aligned with the para-ethnographic approach, key organizational actors discussed their thoughts on service design practices that they participated in and changes in mental models that they experienced or interpreted. The combination of the data gathered by the first author and ongoing conversations with key organizational actors supported a fluid and iterative process of moving between data collection and analysis.

Data analysis
In ethnography, data analysis is not a distinct stage of the research but rather ongoing throughout the fieldwork, taking shape in field notes and embedded within the ethnographer's hunches (Hammersley and Atkinson, 1995). Through a recognition of preliminary patterns in the initial data collected from the field and by using existing literature as a resource, the core concepts of innovation (viewed initially as a process of institutional work) and service design practices were identified. Then, during analysis of the service design practices, the importance of actors' mental models emerged and mental models became an additional core concept in the study. Conversations with organizational actors related to the emerging patterns played a strong role in influencing the identification of the core concepts. For example, in one conversation about the changes that were being catalyzed by service design practices a project manager brought forward the idea that "design changes your mind," which aligned with some of the preliminary data collected about changes in the mindsets of actors. Then through an exploration of the literature, the concept of mental models was chosen as it resonated with the focus of interest for both the researchers and organizational actors. These core concepts provided grounding for the study and helped focus attention during further ethnographic research.

Through continued fieldwork, memo writing and an ongoing review of related literature, a preliminary conceptual framework was developed. This helped to make sense of what was happening in the data by determining relationships between the core concepts identified, including the connection between reshaping mental models on a micro-level and changing institutional arrangements on a macro-level. Soon it became clear that a greater understanding of how service design practices reshape mental models was needed. Here the process of analytical induction was used by describing patterns in the data and searching for negative examples (Hammersley, 1989). In this process of induction, practices from different service design projects were compared (see Appendix 4 for a list of the main projects studied). First, patterns among the practices that seemed to influence mental models were identified through inductive coding of field notes and interview transcripts. These codes included labels such as "surprise," "using the senses," "multiplicity," and "enacting." This code list was refined into the three service design practices of "sensing surprise," "perceiving multiples," and "embodying alternatives" through the techniques of bridging, which combines related codes, and surfacing, which illuminates missing categories (Miles *et al.*, 2014).

Definitions of the three service design practices that reshape mental models were developed and related project examples were identified from the data collected. Through consideration of these examples, components and conditions for each of these practices were delineated. Two researchers with experience in the field were involved in the iterative process of defining and delineating these practices, seeking contradictory views, redundancies and new insights throughout the process of analysis (Erickson and Stull, 1998). Two other researchers offered an outside perspective, questioning the interpretations and providing regular feedback on the analysis. Aligned with the process of analytical induction, additional

practice examples were investigated in the later stage, including searching for negative evidence to refine the understanding of each of the practices. Practice examples were examined to see if they fit the conceptualization of any of the practice types which informed revisions to the definitions of the practices, their components and their enabling conditions. A matrix and visual representations (Fetterman, 1998) were used to compare and contrast these different practices and explore their relationships. Analysis of these practices continued with organizational actors by working together to craft descriptive narratives of key practice examples. Separate from this ethnographic study, three workshops were held to verify the results of the study by asking participants to draw their mental models of a healthcare situation, engage in the identified service design practices and then discuss perceived changes in their mental models through the process.

Findings
Based on the analysis of data from Experio Lab, this section provides details on how service design practices are reshaping the mental models of actors in the Swedish healthcare system. First, the different types of service design practices that contribute to changing mental models and their enabling conditions are described. Then, narratives from the field are used to contextualize these practices and illuminate the relationship between these practices in reshaping mental models.

Three types of service design practices that reshape mental models
Accounts of actors changing their mental models were repeated in many different environments and locations where service design practices were employed in the Swedish healthcare system. Some actors' described it as experiencing an "aha" moment or having "something click in their heads," which enabled them to do things in new ways. The service design practices associated with reshaping mental models were categorized into three distinct types: sensing surprise, perceiving multiples and embodying alternatives. Table I summarizes each of these practice types, their components and their enabling conditions. Sensing surprise involves experiencing a bodily sensation that challenges an actor's existing mental model. Perceiving multiples involves becoming sensitive to alternative mental models through interactions with other actors. Embodying alternatives involves

Service design practices	Sensing surprise	Perceiving multiples	Embodying alternatives
Definition	Experiencing a bodily sensation that challenges an actor's existing mental model	Becoming sensitive to alternative mental models through interaction with other actors	Enacting different mental models to understand their implications
Components	An unexpected event or stimulus New information is taken in through the senses Feelings of shock or awe	Several interpretations of one situation are recognized Direct or indirect discussion with other actors Feelings of conflict, uneasiness or confusion	Physical testing of different ways of working The process of iteration and adaptation Feelings of uncertain optimism or frustration
Enabling conditions	Intentional staging of a provocative situation Coaching an actor to aid them in noticing new things Actor's engagement and understanding of the context	Diversity of actors Openness and safety of actor Visual and tangible tools Skilled facilitation to support sharing	Different context to explore possibilities Supportive physical materials Possibility for repetition and ongoing change in ways of working

Table I.
Types of service design practices and their enabling conditions

enacting different mental models to understand their implications. These service design practices were carried out within service design processes by actors across organizational roles, including clinicians, administrators, developers, managers, designers and patients. Illustrative evidence for the practices can be found in Appendix 1 and for the enabling conditions in Appendix 2. Below these three practice types and their enabling conditions are described in more detail.

Sensing surprise
The practices of sensing surprise expose actors' existing mental models and help them understand their fallibility. This process of disruption often happens through an experience of an unexpected event or stimulus. One interviewee describes her experience doing observations as part of a service design project as follows:

> We were out doing the research for five days at the hospital. We were really open-minded and trying to collect everything we could see. We thought when we started that it might be like this and it might be like this. But it is not going to be what you think from the start […] There are a lot of surprises. (5,1)

It is these surprises that challenge actors existing mental models about particular situations. An actors' senses play a prominent role in their experience of this disruption. Another interviewee highlights the importance of the senses in catalyzing this shift in the following quote:

> And you know what happened there, when you use all your senses, and you smell. People are scared, they are sick, and the nurses just leave. I saw people crying because they didn't like the situation. Something happened with [the physician] when I said, do you smell that? He started to look and take a more curious perspective. (1, 1)

By engaging his sense of smell, the physician became aware of aspects of the situation that he was currently blocking out in his daily practice. This practice of sensing surprise is generally a direct, first-hand experience. During this experience, actors' often recognize feeling a sense of shock or awe. One designer describes the experience of sensing surprise as follows:

> It is like, there is a light in their eyes. They stop what they are doing. Freeze for a fraction of a minute. You can feel it in your body. It is a very bodily feeling – like being overthrown or lit up. It is like finding Christ. They are filled with emotion […] and all of the sudden they see all these flaws and opportunities everywhere […] It goes into your spine. You feel, you hear, you see. If someone just tells you, it doesn't go into your bones. You have to have a personal insight. (12, 1)

However, not all service design projects involved the practice of sensing surprise. Sometimes despite the efforts of service designers and other project leaders, this practice did not transpire because some of the enabling conditions were not met. These practices did take place when there were provocative situations staged, such as doing deliberate observations in a particular context. Actors' sensitivity to the context and engagement in the process was also a strong enabling factor. Furthermore, the process of noticing surprises was enhanced in projects where some actors took on coaching roles to guide others' reflection and encourage them to tap into their bodily senses. A healthcare leader highlighted the value of this coaching role by saying:

> I will make sure that I have these coaches for each moment. They need someone to inspire them or guide them. (10, 1)

This way of going out into situations and taking in surprising information through the senses was foundational to the reshaping of mental models through service design. By noticing new things that existing mental models would have otherwise filtered out, actors began to challenge their existing mental models and recognize that these models are not always accurate or complete depictions of a situation.

Perceiving multiples
The service design practices of perceiving multiples involve making alternative mental models for a situation explicit and apprehensible. By bringing diverse actors together to interact and dialogue, actors are exposed to mental models that are divergent from their own and may begin to appreciate a multiplicity of perspectives. One practitioner reflected on the value of integrating multiple ways of understanding a situation by saying:

> They have their backpacks so to say. They bring their experiences and their perspectives. And I think that is important to be open to other people's perspective. They have their perspective and we have our perspective, and how does that affect each other? (5, 2)

Perceiving multiples involves a process of actors bringing together their ways of looking at the world based on their previous experience and unpacking how these perspectives might be divergent and overlapping. By exposing actors to different ways of understanding the same situation, perceiving multiples helps actors to recognize that many mental models are possible and can co-exist. Part of how these alternative perspectives are surfaced is through different methods of interaction. One educator involved in a service design project reinforced the value of these methods:

> I think we are so different and express ourselves in different ways. You can reach more people by doing this […] It connects with other parts of our brain when you put it into different forms of interaction. (8, 1)

In the service design projects in the Swedish health care system, perceiving multiples often happened through facilitated sharing sessions with supported visual or tangible tools. Within Experio Lab in Västernorrland County, the team often facilitates a particular workshop by having participants draw representations of themselves personally and professionally within a silhouette and share it with others. They found that these drawings really helped to open up the discussion and encourage people to be vulnerable with each other. While this workshop often seemed to catalyze transformational shifts in actors' mental models of each other, not all workshops had the necessary conditions for this change:

> If you create an atmosphere where people can share themselves as human beings, there is potential. They understand that someone else might see things differently. But one group was damp. They didn't trust each other. I thought - do we have enough security? Is it safe enough? (12, 2)

While feelings of conflict, unease or being overwhelmed often seemed to correspond to the practices of perceiving multiples, the openness and safety of actors to share their perspectives was a prominent enabling factor. In some service design processes, actors with divergent perspectives remained silent because they did not feel comfortable sharing alternative perspectives. This prevented other possible mental models from being exposed and understood. In some cases, thoughtful facilitation helped to shift the tone within the group and encourage the sharing of perspectives. Furthermore, in a number of service design projects, there was not sufficient diversity among the actors who were participating to enable this practice. For example, in a workshop with a cohesive clinical team where patients were not able to be recruited, it was difficult to move beyond simply reinforcing participating actors existing assumptions. The enabling conditions of diversity, openness, safety, visual or tangible artefacts and skilled facilitation were significant factors in whether the interaction supported within the service design projects cultivated the practices of perceiving multiples.

Embodying alternatives
The practices of embodying alternatives include the physical testing or enactment of different ways of working based on possible mental models. Actors acknowledged that this

embodiment of alternatives was core to the changes elicited through service design practices. One actor interviewed reinforced this by saying:

> The thing that design brings is experimentation. It is about creating the environment to test and experience something. (14, 1)

These practices of experimentation involve an iterative process of testing out and adapting different mental models. Engaging actors in building out or enacting new mental models helped participants recognize that other ways of doing things were possible and aided them in carrying forward new routines into their everyday life. One common way of embodying alternatives within service design projects was through the use of role play. Below, one designer shares an experience she had with a physician who, by acting out alternative approaches to patient care, unconsciously shifted her current mental model and way of operating within her practice:

> When a doctor was talking about her role-playing experience, she said that it was nothing new, but later she told me that one of the sketches that she was involved in changed the way she did things. She wasn't aware she had been affected […] A lot of times, it goes to the back of your head. It is unconscious, but it goes quite deep. (12, 3)

The practices of embodying multiples often brought with them feelings of uncertain optimism or even frustration. At the time of doing the role play, the physician being referred to in the quote above was feeling quite agitated by the process. Furthermore, this practice of embodying alternatives seems to benefit from bringing actors into a different environment and using supportive physical materials to enact different mental models. One physician reflected on the importance of context and physical materials after going into patients' homes as part of a service design project by saying:

> When I am out in someone's home in my private clothes, it makes me see other aspects of their problems than if they come into my office and I am in my white pyjamas. It's about role-playing in a way. When I am in my professional role I wear white pyjamas and it transforms me. I have a very strong feeling that the clothes that you put on at work and other artefacts really affect you. (13, 1)

While the practices of embodying alternatives are iterative, some actors were not enabled to continue these practices in an ongoing way because of a lack of support in their everyday contexts to repeat and continue to change their ways of working. In some projects, the existing structures within the healthcare unit did not allow for the flexibility to continue these alternative practices.

Dynamics of service design practices

The practices of sensing surprise, perceiving multiples and embodying alternatives are not entirely distinct, but rather intimately connected and often, although not always, co-dependent. Sometimes one of these practices leads to another practice that continues to reshape actors' mental models. Often the practices of sensing surprise opened actors up for perceiving multiples, which then provided an impetus for embodying alternatives. Furthermore, the practice of embodying alternatives could lead again to sensing surprise. Below is a narrative from the field about Edith, a nurse who experienced this iterative process of reshaping mental models in one of Experio Lab's first service design projects:

> Edith, a nurse who had been working for forty years, was one of dozens of healthcare providers from across the hospital that were brought together every Friday to reenact the patient experience before, during and after treatment. On one particular day, Edith lay there strapped down on the stretcher playing the role of the patient. The world blurred by as she was rushed through the hospital corridors. She noticed the lights passing by overhead and started to count the dots on the ceiling. She felt powerless with no control over where she was being taken. The experience

was not what she expected. She had been through this process thousands of times, but seeing it and feeling it from this angle took her off guard.

Following the role play, when Edith and her colleagues reflected on their own experience, she started to feel ashamed. Edith had thought she was pretty good at her job. She had talked a lot about "patient-centered care", but now she realized that she had not fully understood the perspective of the patient. Provoked by her experience, Edith started to think differently about patient care. She said that: "afterwards it was often about being able to stop for half a second and ask myself if it was so extremely important to put on that blood pressure cuff now or should I let the patient breath a few minutes, show them where the toilets are, get a glass of water to create a positive situation, and take in the patient's needs." Unfortunately, Edith faced resistance in her new way of doing things from her team and eventually changed jobs to a new unit out of frustration.

In this case, Edith first had an unsettling experience on the stretcher that challenged her current mental model (sensing surprise); she then started to apprehend different perspectives on patient care (perceiving multiples); next, she tried out new models of care when seeing patients in the hospital (embodying alternatives); and then ran into unexpected barriers when trying to do things differently in her nursing practice (sensing surprise). However, this particular sequence of practices was not always the case in service design projects. Below is a narrative of Sofia who experienced a different sequence and relationship between these practices:

Sofia, a social worker from the local youth mental health clinic, was involved in a two-year-long service design project. As part of this project, the team held a prototyping workshop that brought together youth from the local school, teachers, politicians and a variety of clinical staff. The room was humming with excitement as they built out their visions. One youth was talking about creating a new subject for mental health in school and another had the idea to make a system for teachers to monitor their students' workload and emotions so that they could adjust their homework accordingly. Around the table, the youth were eagerly prototyping their ideas with lego and craft supplies. Sofia had never worked in this way before. As a social worker supporting youth in crisis, she was always in the expert role. Even sometimes when she went to the grocery store, she would be stopped because someone needed her help.

However, during the workshop, she was taking a back seat and listening to youth's ideas about how they might better manage their mental health. It was challenging not to have the solutions for everything and to let youth take the lead, but, in doing so, Sofia realized how resourceful the youth seemed. She never got the chance to appreciate that in counseling sessions. Seeing youth as increasingly capable, opened Sofia up for interactions with youth that she had not had before. She started to ask questions differently to youth during her counseling sessions and changed how she answered the phone. Instead of overwhelming youth with specific questions about their eating and sleeping patterns, she left their conversations more open. Sofia even started to advocate to her colleagues at the clinic why further changes in their ways of working were needed and helped to involve them in other service design workshops so that they could experience some of these things first hand.

In a slightly different sequence, Sofia took on the role of a facilitator at the prototyping workshop which sparked her to enact a mental model for interacting with youth that was fundamentally different to the expert-client mental model that she regularly enacted (embodying alternatives). By taking on a different role, Sofia began to get a new understanding of youth's perspective on mental health (perceiving multiples). However, during this process, Sofia was never really viscerally provoked to challenge her existing expert-patient mental model and when prompted said she did not see the two as mutually exclusive. However, she did start to change some of her ways of working within the clinic, such as answering the phone differently (embodying alternatives).

As these narratives show, there is significant interplay between these services design practices, but they do not necessarily happen within one particular sequence. An analysis of

the patterns in these and other narratives highlights that the enactment of one of these practices can trigger the other two practices to occur by creating one or more of the enabling conditions for the latter practices. However, these practices only take place if all of the necessary conditions for these practices exist. As such, there were countless different combinations of these practices that occurred over time within the various service design processes, based on the evolving conditions. Table II summarizes some of the most common combinations of service design practices enacted based on these and other narratives. In Edith's case, the practice of sensing surprise led to perceiving multiples by facilitating greater openness toward other perspectives. The practice of perceiving multiples contributed to embodying alternatives, in this case by creating video footage and reflective maps that aided the nurse in thinking about how different mental models could be enacted along the patient journey. Then the practice of embodying alternatives triggered sensing surprise by staging a provocative situation within the nurse's clinical team. In Sofia's case, embodying alternatives led to perceiving multiples and then again to embodying alternatives, but not to sensing surprise because she did not experience a provoking situation nor did she receive coaching at that time that helped her to see things that challenged her existing mental model.

Reshaping mental models
The narratives from the field illuminate not only how service design practices contribute to reshaping mental models, but also that changes in mental models can contribute to the further and ongoing enactment of service design practices. For example, in both Edith & Sofia's situations their changed mental models contributed to them embodying alternatives within another context, and for Sofia, encouraging her colleagues to do the same. While the narratives focus on the experiences of one individual, they touch on some of the interactions between actors with different mental models in relation to these service design practices. Sometimes, such as between Sofia and the youth at the workshop, having actors with different mental models can support the enactment of one or more of these service design practices. However, when the enabling conditions do not exist, such as when Edith attempted to continue to embody alternatives within her clinical team, actors' differing or changed mental models did not inherently contribute to the enactment of these service design practices within the given context. As such, the enabling conditions of sensing surprise, perceiving multiples and embodying alternatives are central to the ongoing process of reshaping mental models through service design practices.

Furthermore, it should be noted that in many cases these service design practices were themselves based on alternative mental models that differed from those of the practices that actors regularly enact. In the case of Edith, playing the role of the patient on the stretcher is itself based on a mental model that assumes the importance of the patient experience.

First service design practice enacted	Enabling condition created	Second service design practice triggered
Sensing surprise	Openness and safety actor	Perceiving multiples
Sensing surprise	Different context to explore possibilities	Embodying alternatives
Perceiving multiples	Actor's engagement and understanding of the context	Sensing surprise
Perceiving multiples	Supportive physical materials	Embodying alternatives
Embodying alternatives	Intentional staging of a provocative situation	Sensing surprise
Embodying alternatives	Several interpretations of one situation are recognized	Perceiving multiples

Table II.
Common combinations
of service design
practices

By enacting this service design practice, Edith was able to challenge the failability of her own mental model. As such, the narratives show that service design practices and mental models influence each other and cannot be fully disentangled.

These narratives also expose how reshaping mental models through service design practices can enable institutional work with the potential to change institutional arrangements. Edith's experience of playing the role of the patient contributes to disrupting the existing institutional arrangements in the hospital by eroding the perceived value of the institutionalized ways of working for nurses. In addition, as Sofia starts to enact the role of the facilitator, rather than an expert, she contributes to creating new institutional arrangements that diverge from those of the professional relationship entrenched within the clinical setting. These narratives reveal that reshaping mental models through service design practices is intertwined with processes of institutional work. Further illustrative evidence of institutional work in connection to service design practices can be found in Appendix 7. Both narratives illuminate the dynamic negotiation between mental models and institutional arrangements. Individuals might alter their mental models, but to innovate they must also work within existing institutional arrangements to create more wide-spread changes that align with alternative mental models.

## Implications and future research
This section considers the implications of this paper to service research and practice, as well as the limitations and opportunities for future research.

Theoretical implications
The purpose of this paper is to analyze how service design practices can reshape mental models to enable innovation in service ecosystems. This paper builds theory on innovation in service ecosystems through service design connecting the macro view of innovation as changing institutional arrangements with the micro view of innovation as reshaping actors' mental models. From the ethnographic study, three types of service design practices were identified (sensing surprise, perceiving multiples and embodying alternatives) that contribute to reshaping mental models. The findings also reinforce that the enactment of one of these practices can prompt other service design practices to occur by contributing to the enabling conditions. Furthermore, the findings highlight that reshaping mental models can in turn contribute to the futher enactment of service design practices, but only if the enabling conditions for those practices exist. The dynamics between service design practices and reshaping mental models in innovation at the micro-level are depicted in Figure 2. Linking back to the conceptual framework presented earlier, by reshaping mental models, service design practices make innovation, conceptualized at the macro-level as changing institutional arrangements possible. As such, this paper has two main implications for service research: extending the understanding of innovation from a service ecosystem perspective by highlighting the role of reshaping mental models at the micro-level, and delineating how service design practices contribute to reshaping mental models and enabling innovation through an ethnographic study.

The first implication, while inspired by and contextualized through the field work, is derived mainly from the unification of dispursed existant literature into an integrative conceptual framework (MacInnis, 2011). By drawing together research on innovation in service ecosystems, mental models and service design practices, this conceptual framework explains the micro-macro relations of innovation in service ecosystems through service design. This framework extends existing literature on innovation from a service ecosystem perspective, which has previously focused on the macro-level process of changing institutional arrangements (Koskela-Huotari *et al.*, 2016; Vargo *et al.*, 2015), by highlighting the corresponding micro-level practices of reshaping mental models. In doing so, this study addresses the need for research at
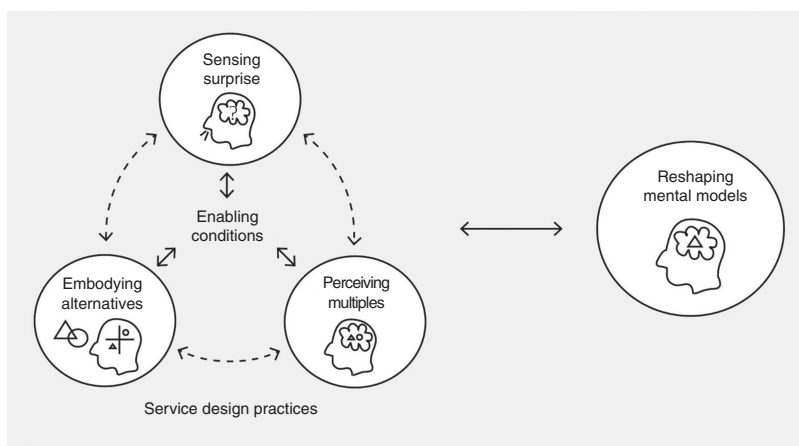
Figure 2.
Micro-level dynamics
of innovation through
service design
practices

the level of the individual actor (Battilana and D'Aunno, 2009) and contributes to developing the micro-foundations for the service ecosystem perspective that has been in need of further development (Wilden *et al.*, 2017). By delineating the interplay between mental models and institutional arrangements, this research helps to explain how actors can act in divergent ways amid existing institutional pressures by reshaping their own mental models using service design practices. In doing so, this study helps to make the service ecosystem view of innovation more implementable for organizations and relevant for informing research on innovation strategy.

While the concept of mental models has been absent from service research in recent years (Strandvik *et al.*, 2014), the conceptual framework calls out the importance of the neglected role of mental models and details how reshaping mental models at the micro-level is needed for actors to engage in changing institutional arrangements at a macro-level. By zooming in on the practices of reshaping mental models, this research sheds light on the critical cognitive aspects that have been overlooked in previous accounts of how actors are able to change institutional arrangements (Suddaby *et al.*, 2016). Furthermore, this research highlights that actors are not simply embedded in their social context (Edvardsson *et al.*, 2011), but collectively construct this context through their own mental models. As such, shaping social context to enable innovation (Koskela-Huotari *et al.*, 2016; Vargo *et al.*, 2015), requires that actors are not only changing something "out there," but actually changing their own beliefs and assumptions. With the demonstrated relevance of focusing on reshaping actors mental models at a micro-level, empirical studies and experiments related to the systems perspective on innovation (Helkkula *et al.*, 2017) become more accessible for researchers.

The second implication, while informed by existing literature on service design and mental models, was derived mainly from 18 months of fieldwork on service design practices in the Swedish healthcare system. Through a rich ethnographic study, this research contributes to providing a grounded, contextual and practical understanding of how actors can reshape their mental models to enable innovation through service design. Existing research suggests that service design can be a catalyst for innovation (Andreassen *et al.*, 2016), but there has been a need to deepen the understanding of the connection between service design and innovation (Patrício *et al.*, 2018). To strengthen this link, this study builds

on existing research that highlights service design as a means of doing institutional work (Wetter-Edman *et al.*, 2018) by providing a nuanced understanding of the three types of service design practices that reshape mental models. This research suggests that it is through these practices, supported by the methods and tools that have been in focus in previous research (Karpen *et al.*, 2017), that service design drives innovation in service ecosystems. While the identified practices may not be exclusive to service design, these practices are nonetheless central to its process of catalyzing innovation at the micro-level. With greater knowledge regarding the conceptual links between service design practices and innovation, as well as related contingencies, research can better explain how and when service design contributes to institutional change and better inform service designers and service managers on the environments they need to create to catalyze innovation.

Furthermore, this research helps to answer lingering questions about if and how service design practices might help explain aspects of service-dominant logic through a micro-foundations approach (Karpen *et al.*, 2017; Kurtmollaiev *et al.* 2018), with a particular focus on innovation in service ecosystems. This study links previous research highlighting the importance of actors aesthetic experiences in service design (Stephens and Boland, 2015; Wetter-Edman *et al.*, 2018) with existing literature on design cognition (Dorst, 2011), by illuminating the practices of reshaping mental models through service design. This research also provides a rationale for previous studies that highlight the importance of surprises (Stompff *et al.*, 2016) and team diversity (Trischler *et al.*, 2018) in service design. By detailing the service design practices that reshape mental models, providing narrative accounts and synthesizing enabling conditions, this research advances theory on service design practices that has been previously neglected (Karpen *et al.*, 2017). More specifically, the descriptions of these three service design practices and their enabling conditions support the development of process measures for service design that can aid in diagnosing whether service design efforts are on track for innovation and inform what can be done to support course corrections. Furthermore, this research responds to emerging interest in service design as a cornerstone for transformative service research (Patrício *et al.*, 2018), particularly within healthcare (Anderson *et al.*, 2018), by detailing how service design can be used to shift mental models and institutional arrangements that may be getting in the way of patient engagement, collaborative patient–provider relationships and health equity.

Practical implications

Without a strong theoretical underpinning of the link between service design and innovation, it has been difficult for service managers and service designers to understand how best to measure service design projects. Rather than measuring the success of service design initiatives based on outputs, such as the number of new touch points or service offerings created, the findings of this research highlight process measures that can help practitioners understand if they are on track for innovation over the long term. In particular, service managers and service designers could measure changes in mental models through, for example, before and after surveys of service design participants or a series of visualizations done over time by participants depicting a particular aspect of the service ecosystem that is in focus (e.g. the doctor-patient relationship). Furthermore, using the descriptions of the three service design practices that reshape mental models – sensing surprise, perceiving multiples and embodying alternatives – practitioners can capture stories of reshaping mental models as they occur to inform their ongoing efforts to innovate and help explain the value of the process to those who are new to service design.

By identifying the enabling conditions for the three service design practices (summarized in Table I), this research highlights some of the different approaches and environments that

are beneficial for reshaping mental models. The role of coaching to support participants in noticing new things that might challenge their existing mental models was of particular relevance for sensing surprise. Practitioners could benefit from being coached through processes of self-reflection with video or exploratory self-documentation using design probes to help them deconstruct how their mental models are influencing their actions. Furthermore, the need for skillful facilitation amidst conflict and resistance was found to be critical for supporting the practice of perceiving multiples. Cocreating physical models or finding visual metaphors that represent actors' different ways of perceiving service ecosystems could be a promising basis for facilitating a rich and open dialogue amid conflicting perspectives. In addition, to enable the practice of embodying alternatives, it was important for actors to move into different contexts that had supportive physical materials. For example, in healthcare, it might be beneficial to bring a clinical team into an empty wing of the hospital to roleplay ways of working with new mental models. In general, investing in and utilizing the aesthetic competencies of service designers to consider the appropriate materials and stage supportive environments can aid in the process of intentionally reshaping mental models.

Limitations and future research

As an underpinning of institutional arrangements, the authors of this paper believe that research on mental models can aid in moving beyond the macro-level focus that has been dominant in the literature on service ecosystems (Vargo and Lusch, 2016) and help to flesh out the dynamics of the micro-foundations approach associated with service design (Karpen *et al.*, 2017; Kurtmollaiev *et al.*, 2018). Further empirical investigation and intentional experimentation could aid in developing a more refined and robust understanding of the relationship between service design practices and mental models that have been proposed here. In this study mental models were not explicitly measured, but rather inferred through interpretation of actors' practices and conversations. While this is typical of ethnography, future research could set up experiments to examine changes in mental models more explicitly. An additional limitation of the present study is that it is based in only one context. Future research should aim to generalize and extend the findings of this study by investigating other contexts of innovation. Does innovation in all service ecosystems depend on reshaping actors' mental models? Are additional service design practices used to reshape mental models in other contexts? Do new enabling conditions for these practices arise in other contexts?

Future research could focus on how specific service design methods and tools contribute to reshaping mental models. For example, how do service blueprints (Bitner *et al.*, 2008) or experience rooms (Edvardsson and Enquist, 2010) encourage the service design practices that alter actors' mental models? There is also a need to investigate how service design methods could be refined or new service design methods developed to more effectively reshape mental models to foster innovation. This study focused explicitly on the practices associated with reshaping mental models, but as the importance of maintenance is increasingly recognized in the study of institutional work (Siebert *et al.*, 2017), future research is needed to examine the practices that intentionally reinforce or strengthen existing mental models. Furthermore, while this study focuses on the micro-level of individual actors over a relatively short period of time, further study is needed to understand if these changes in mental models continue over long time periods, as well as when and how they translate into changes in shared mental models in service ecosystems. While there is great potential for innovation in service ecosystems through such an approach, there is also a pressing need for discussion and investigation into the ethical and political implications of these practices that reshape mental models.

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References

Akaka, M.A., Vargo, S. and Wieland, H. (2017), "Extending the context of innovation: the co-creation and institutionalization of technology and markets", in Russo-Spena, T., Mele, C. and Nuutinen, M. (Eds), *Innovating in Practice: Perspectives and Experiences*, Springer International Publishing, pp. 43-57.

Akama, Y. and Prendiville, A. (2013), "Embodying, enacting and entangling design: a phenomenological view to co-designing services", *Swedish Design Journal*, Vol. 1 No. 13, pp. 29-40.

Anderson, S., Nasr, L. and Rayburn, S.W. (2018), "Transformative service research and service design: synergistic effects in healthcare", *The Service Industries Journal*, Vol. 38 Nos 1-2, pp. 99-113.

Andreassen, T.W., Kristensson, P., Lervik-Olsen, L., Parasuraman, A., McColl-Kennedy, J.R., Edvardsson, B. and Colurcio, M. (2016), "Linking service design to value creation and service research", *Journal of Service Management*, Vol. 27 No. 1, pp. 21-29.

Artman, H. (1999), "Fördelade kunskapsprocesser i ledningscentraler vid nödsituationer: koordination och situationsmedvetenhet", doctoral dissertation, Linköping University, Linköping.

Battilana, J. and D'Aunno, T. (2009), "Institutional work and the paradox of embedded agency", in Lawrence, T., Suddaby, R. and Leca, B. (Eds), *Institutional Work: Actors and Agency in Institutional Studies of Organizations*, Cambridge University Press, Cambridge, pp. 31-58.

Berggren, P. (2016), "Assessing shared strategic understanding", doctoral dissertation, Linköping University, Linköping.

Berry, L.L. and Bendapudi, N. (2007), "Healthcare: a fertile field for service research", *Journal of Service Research*, Vol. 10 No. 2, pp. 111-122.

Bitner, M.J., Ostrom, A.L. and Morgan, F.N. (2008), "Service blueprinting: a practical technique for service innovation", *California Management Review*, Vol. 50 No. 3, pp. 66-94.

Blomkvist, J., Holmlid, S. and Segelström, F. (2010), "This is service design research: yesterday, today and tomorrow", in Stickdorn, M. and Schneider, J. (Eds), *This Is Service Design Thinking*, BIS Publishers, Amsterdam, pp. 308-315.

Chandler, J.D. and Vargo, S.L. (2011), "Contextualization and value-in-context: how context frames exchange", *Marketing Theory*, Vol. 11 No. 1, pp. 35-49.

Chandy, R.K. and Tellis, G.J. (1998), "Organizing for radical product innovation: the overlooked role of willingness to cannibalize", *Journal of Marketing Research*, Vol. 35 No. 4, pp. 474-487.

Collins and Gentner (1987), "How people construct mental models", in Holland, D. and Quinn, N. (Eds), *Cultural Models in Language and Thought*, Cambridge University Press, Cambridge, pp. 243-265.

Craik, K. (1943), *The Nature of Explanation*, Cambridge University Press, Cambridge.

Dahlbäck, N., Kristiansson, M. and Stjernberg, F. (2013), "Distributed remembering through active structuring of activities and environments", *Review of Philosophy and Psychology*, Vol. 4 No. 1, pp. 153-165.

Dean, J.P., Eichorn, R.L. and Dean, L.R. (1967), "Fruitful informants for intensive interviewing", in Doby, J. (Ed.), *An Introduction to Social Research*, Appleton-Century-Crofts, New York, NY, pp. 284-286.

Denzau, A.T. and North, D.C. (1994), "Shared mental models: ideologies and institutions", *KYKLOS*, Vol. 47 No. 1, pp. 3-31.

Dequech, D. (2013), "Logics of action, provisioning domains, and institutions: provisioning institutional logics", *Journal of Economic Issues*, Vol. 47 No. 1, pp. 95-112.

Dorst, K. (2011), "The core of 'design thinking' and its application", *Design Studies*, Vol. 32, pp. 521-532.

Edvardsson, B. and Enquist, B. (2010), "Design dimensions of experience rooms for service test drives: case studies in several service contexts", *Managing Service Quality: An International Journal*, Vol. 20 No. 4, pp. 312-327.

Edvardsson, B. and Tronvoll, B. (2013), "A new conceptualization of service innovation grounded in S-D logic and service systems", *International Journal of Quality and Service Sciences*, Vol. 5 No. 1, pp. 19-31.

Edvardsson, B., Tronvoll, B. and Gruber, T. (2011), "Expanding understanding of service exchange and value co-creation: a social construction approach", *Journal of Academic Marketing*, Vol. 39 No. 2, pp. 327-339.

Eisenhardt, K.M. (1989), "Building theories from case study research", *Academy of Management Review*, Vol. 14 No. 4, pp. 532-550.

Erickson, K. and Stull, D. (1998), *Doing Team Ethnography: Warnings and Advice*, Sage Publications Inc., Thousand Oaks, CA.

Fetterman, D.M. (1998), *Ethnography: Step-by-Step (2nd Ed.), Applied Social Research Methods Series,* Vol. 17, SAGE, London.

Flyvbjerg, B. (2006), "Five misunderstandings about case-study research", *Qualitative Inquiry*, Vol. 12 No. 2, pp. 219-245.

Frake, C.O. (1962), "Cultural ecology and ethnography", *American Anthropologist*, Vol. 64 No. 1, pp. 53-59.

Friedland, R. and Alford, R.R. (1991), "Bringing society back in: symbols, practices and institutional contradictions", in Powell, W.W. and DiMaggio, P.J. (Eds), *The New Institutionalism in Organizational Analysis*, The University of Chicago Press, Chicago, IL, pp. 232-263.

Gangemi, A., Mancini, F. and Johnson-Laird, P.N. (2013), "Models and cognitive change in psychopathology", *Journal of Cognitive Psychology*, Vol. 25 No. 2, pp. 157-164.

Greenwood, R., Oliver, C., Sahlin, K. and Suddaby, R. (2008), "Introduction", in Greenwood, R., Oliver, C., Sahlin, K. and Suddaby, R. (Eds), *SAGE Handbook of Organizational Institutionalism*, SAGE, London, pp. 1-46.

Guiette, A. and Vandenbempt, K. (2013), "Exploring team mental model dynamics during strategic change implementation in professional service organizations: a sensemaking perspective", *European Management Journal*, Vol. 31 No. 6, pp. 728-744.

Hammersley, M. (1989), *The Dilemma of Qualitative Method: Herbert Blumer and the Chicago Tradition*, Routledge, London.

Hammersley, M. and Atkinson, P. (1995), *Ethnography: Principles in Practice*, 2nd ed., Routledge, London.

Hegarty, M., Stieff, M. and Dixon, B.L. (2013), "Cognitive change in mental models with experience in the domain of organic chemistry", *Journal of Cognitive Psychology*, Vol. 25 No. 2, pp. 220-228.

Helkkula, A., Kowalkowski, C. and Tronvoll, B. (2017), "Archetypes of service innovation: implications for value cocreation", *Journal of Service Research*, Vol. 21 No. 3, pp. 284-301.

Holmes, D.R. and Marcus, G.E. (2008), "Para-ethnography", in Given, L.M. (Ed.), *SAGE Encyclopedia of Qualitative Research Methods*, SAGE, Thousand Oaks, CA, pp. 596-597.

Holmlid, S., Wetter-Edman, K. and Edvardsson, B. (2017), "Breaking free from NSD: design and service beyond new service development", in Sangiorgi, D. and Prendiville, A. (Eds), *Designing for Service: Key Issues and New Directions*, Bloomsbury, New York, NY, pp. 121-131.

Hutchins, E. (1995), *Cognition in the Wild*, MIT Press, Cambridge, MA.

Hutchins, E. (2014), "The cultural ecosystem of human cognition", *Philosophical Psychology*, Vol. 27 No. 1, pp. 34-49.

Islam, G. (2015), "Practitioners as theorists: para-ethnography and the collaborative study of contemporary organizations", *Organizational Research Methods*, Vol. 18 No. 2, pp. 231-251.

Johnson-Laird, P.N. (1980), "Mental models in cognitive science", *Cognitive Science*, Vol. 4 No. 1, pp. 71-115.

Johnson-Laird, P.N. (2010), "Mental models and human reasoning", *Proceedings of the National Academy of Sciences*, Vol. 107 No. 43, pp. 18243-18250.

Johnson-Laird, P.N. (2013), "Mental models and cognitive change", *Journal of Cognitive Psychology*, Vol. 25 No. 2, pp. 131-138.

Johnson-Laird, P.N. and Savary, F. (1999), "Illusory inferences: a novel class of erroneous deductions", *Cognition*, Vol. 71, pp. 191-229.

Karpen, I.O., Gemser, G. and Calabretta, G. (2017), "A multilevel consideration of service design conditions: towards a portfolio of organisational capabilities, interactive practices and individual abilities", *Journal of Service Theory and Practice*, Vol. 27 No. 2, pp. 384-407.

Khemlani, S. and Johnson-Laird, P.N. (2013), "Cognitive changes from explorations", *Journal of Cognitive Psychology*, Vol. 25 No. 2, pp. 131-138.

Kimbell, L. (2011), "Designing for service as one way of designing services", *International Journal of Design*, Vol. 5 No. 2, pp. 41-52.

Koskela-Huotari, K., Edvardsson, B., Jonas, J.M., Sörhammar, D. and Witell, L. (2016), "Innovation in service ecosystems: breaking, making and maintaining institutionalized rules of resource integration", *Journal of Business Research*, Vol. 69 No. 8, pp. 2964-2971.

Kurtmollaiev, S., Fjuk, A., Pedersen, P.E., Clatworthy, S. and Kvale, K. (2018), "Organizational transformation through service design: the institutional logics perspective", *Journal of Service Research*, Vol. 21 No. 1, pp. 59-74.

Lawrence, T.B. and Suddaby, R. (2006), "Institutions and institutional work", in Glegg, S., Hardy, C., Lawrence, T.B. and Nord, W.R. (Eds), *Handbook of Organization Studies*, 2nd Ed., Sage, London, pp. 215-254.

Lusch, R. and Nambisan, S. (2015), "Service innovation: a service-dominant logic perspective", *MIS Quarterly*, Vol. 39 No. 1, pp. 155-175.

Lusch, R.F. and Vargo, S.L. (2014), *Service-Dominant Logic: Premises, Perspectives, Possibilities*, Cambridge University Press, Cambridge.

MacInnis, D.J. (2011), "A framework for conceptual contributions in marketing", *Journal of Marketing*, Vol. 75 No. 4, pp. 136-154.

Mager, B. (2017), *Service design impact report: Heath sector*, Service Design Network, Köln, available at: www.service-design-network.org/books-and-reports/impact-report-health-sector (accessed February 22, 2018).

Meyer, J.W. and Rowan, B. (1977), "Institutionalized organizations: formal structure as myth and ceremony", *American Journal of Sociology*, Vol. 83 No. 2, pp. 340-363.

Miles, M.B., Huberman, A.M. and Saldaña, J. (2014), *Qualitative Data Analysis: A Method Sourcebook*, Sage, Thousand Oaks, CA.

Murray, M.A. and Byrne, R.M.J. (2013), "Cognitive change in insight problem solving: initial model errors and counterexamples", *Journal of Cognitive Psychology*, Vol. 25 No. 2, pp. 210-219.

North, D.C. (1990), *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge.

Núñez, R. (2006), "Do real numbers really move? language, thought, and gesture: the embodied cognitive foundations of mathematics", in Hersh, R. (Ed.), *Unconventional Essays on the Nature of Mathematics*, Springer, New York, NY, pp. 160-181.

Patrício, L., Gustafsson, A. and Fisk, R. (2018), "Upframing service design and innovation for research impact", *Journal of Service Research*, Vol. 21 No. 1, pp. 3-16.

Patrício, L., Fisk, R.P., Falcão e Cunha, J. and Constantine, L. (2011), "Multilevel service design: from customer value constellation to service experience blueprinting", *Journal of Service Research*, Vol. 14 No. 2, pp. 180-200.

Pirsig, R.M. (1974), *Zen and the Art of Motorcycle Maintenance*, Bantam, New York, NY.

Prahalad, C.K. and Bettis, R.A. (1986), "The dominant logic: a new linkage between diversity and performance", *Strategic Management Journal*, Vol. 7 No. 6, pp. 485-501.

Rogers, Y. and Ellis, J. (1994), "Distributed cognition: an alternative framework for analysing and explaining collaborative working", *Journal of Information Technology*, Vol. 9 No. 2, pp. 119-128.

Rylander, A. (2009), "Design thinking as knowledge work: epistemological foundations and practical implications", *Design Management Journal*, Vol. 4 No. 1, pp. 7-19.

Sangiorgi, D. and Prendiville, A. (2015), "A theoretical framework for studying service design practices: first steps to a mature field", *Design Management Journal*, Vol. 9 No. 1, pp. 61-73.

Schensul, S.L., Schensul, J.J. and LeCompte, M.D. (1999), *Essential Ethnographic Methods: Observations, Interviews, and Questionnaires,* Vol. 2, AltaMira Press, Oxford.

Scott, W.R. (1995), *Institutions and Organizations: Foundations for Organizational Science*, SAGE, London.

Siebert, S., Wilson, F. and Hamilton, J.R. (2017), "Devils may sit here:" the role of enchantment in institutional maintenance", *Academy of Management Journal*, Vol. 60 No. 4, pp. 1607-1632.

Siltaloppi, J. (2016), "Framing service as ideology and practice: cognitive underpinnings of service transformation in Finland's Residential Sector", Aalto University Publication Series Doctoral Dissertations No. 186, Aalto University School of Engineering, Helsinki.

Siltaloppi, J., Koskela-Huotari, K. and Vargo, S.L. (2016), "Institutional complexity as a driver for innovation in service ecosystems", *Service Science*, Vol. 8 No. 3, pp. 333-343.

Stephens, J.P. and Boland, B.J. (2015), "The aesthetic knowledge problem of problem-solving with design thinking", *Journal of Management Inquiry*, Vol. 24 No. 3, pp. 219-232.

Stompff, G., Smulders, F. and Henze, L. (2016), "Surprises are the benefits: reframing in multidisciplinary design teams", *Design Studies*, Vol. 47, November, pp. 187-214.

Strandvik, T., Holmlund, M. and Grönroos, C. (2014), "The mental footprint of marketing in the boardroom", *Journal of Service Management*, Vol. 25 No. 2, pp. 241-252.

Suddaby, R., Viale, T. and Gendron, Y. (2016), "Reflexivity: the role of embedded social position and entrepreneurial social skill in processes of field level change", *Research in Organizational Behavior*, Vol. 36, pp. 225-245.

Trischler, J., Kristensson, P. and Scott, D. (2018), "Team diversity and its management in a co-design team", *Journal of Service Management*, Vol. 29 No. 1, pp. 120-145.

Vargo, S. and Lusch, R. (2016), "Service-dominant logic 2025", *International Journal of Research in Marketing*, Vol. 34 No. 1, pp. 46-67.

Vargo, S., Wieland, H. and Akaka, M.A. (2015), "Innovation through Institutionalization: a service ecosystems perspective", *Industrial Marketing Management*, Vol. 44 No. 1, pp. 63-72.

Vink, J., Wetter-Edman, K. and Aguirre, M. (2017), "Designing for aesthetic disruption: altering mental models in social systems through designerly practices", *The Design Journal*, Vol. 20 No. Sup. 1, pp. S2168-S2177.

Vink, J., Prestes Joly, M., Wetter-Edman, K., Tronvoll, B. and Edvardsson, B. (2019), "Changing the rules of the game in healthcare through service design", in Pfannstiel, M.A. and Rasche, C. (Eds), *Service Design and Service Thinking in the Healthcare and Hospital Management*, Springer International Publishing AG, Cham, pp. (in print).

Voronov, M. and Yorks, L. (2015), "'Did you notice that?' theorizing differences in the capacity to apprehend institutional contradictions", *Academy of Management Review*, Vol. 40 No. 4, pp. 563-586.

Wang, V., Lee, S.Y.D. and Maciejewski, M.L. (2015), "Inertia in healthcare organizations: a case study of peritoneal dialysis services", *Healthcare Management Review*, Vol. 40 No. 3, pp. 203-213.

Wason, P.C. (1964), "The effect of self-contradiction on fallacious reasoning", *Quarterly Journal of Experimental Psychology*, Vol. 16 No. 1, pp. 30-34.

Wetter-Edman, K., Vink, J. and Blomkvist, J. (2018), "Staging aesthetic disruption through design methods for service innovation", *Design Studies*, Vol. 55, March, pp. 5-26.

Wetter-Edman, K., Sangiorgi, D., Edvardsson, B., Holmlid, S., Grönroos, C. and Mattelmäki, T. (2014), "Design for value co-creation: exploring synergies between design for service and service logic", *Service Science*, Vol. 6 No. 2, pp. 106-121.

Wilden, R., Akaka, M.A., Karpen, I.O. and Hohberger, J. (2017), "The evolution and prospects of service-dominant logic: an investigation of past, present, and future research", *Journal of Service Research*, Vol. 20 No. 4, pp. 345-361.

Witell, L., Snyder, H., Gustafsson, A., Fombelle, P. and Kristensson, P. (2016), "Defining service innovation: a review and synthesis", *Journal of Business Research*, Vol. 69 No. 8, pp. 2863-2872.

Appendix 1

Figure A1.
Observation framework

Appendix 2

No.	Role	Related service design project(s)
1	Project leader	Test Tube Trip, Patient Journey, Seniors Resource Center
2	Service designer	First Line, InForCare
3	Service designer	First Line
4	Communications staff	Seniors Resource Center, ECT Journey
5	Project leader	Contamination Free Room
6	External stakeholder	Patient Journey
7	Counselor	First Line
8	Educator	First Line
9	Technology support staff	Contamination Free Room
10	Patient safety manager	Test Tube Trip, Seniors Resource Center
11	Nurse/project leader	Chronically Involved
12	Service designer	Chronically Involved, Contamination Free Room
13	Doctor/project leader	Hospital Discharge
14	Service designer	Sexual Health for Newcomers

Table AI.
List of interviewees
and related service
design projects

Appendix 3. Interview guide
To begin, the purpose of the research was introduced as an investigation into the role of service design in supporting innovation within the health system. Then, the interview process and the consent form were explained and the participants were asked to sign the form prior to answering any questions. After the consent form was signed, the audio recorder was started.

Personal connection to service design projects
- Can you tell me about you and your role within the health system?
- What service design project(s) have you been involved in during your time here?

Changes from service design project(s)
- Did you see or experience any changes that resulted from this/these project(s)? If so, what changed?
- What have been the most impactful experiences for you within this/these service design project(s)?
- What role do you think service design had in supporting these experiences?
- Was there anything in the service design project(s) that you thought got in the way of these changes occurring?

Shifts in mental models
- What would you say was your way of thinking about this work before the project?
- Did your way of thinking about this work shift in any way for you personally, or for others involved, in the process of the project?
- (If a change occurred) What aspects of the project do you think contributed to this/these changes?
- (If a change occurred) In what way has this affected your everyday work or your team's work?

Closing

- Is there anything else that you think is important to consider when investigating how service design supports innovation in the healthcare system?

- Are there any activities coming up related to this/these project(s) that you think might be valuable to observe?

- Is there anyone else that you think could provide another perspective on this/these service design project(s)?

Appendix 4

Project	Description	Key activities
Test Tube Trip	The aim of this project was to reduce errors in the tissue and blood sampling process	This project engaged service providers, including midwives, doctors and technicians, in observing the test tube process through different departments in the hospital and prototyping new approaches that could help reduce errors
Resource Centre 2.0	This project sought to improve security and independence for seniors by reimagining service within a retirement home	This project involved staff from the county and municipalities as well as seniors in conducting interviews to understand seniors' needs and creating future scenarios for seniors' care in the region
First Line	This project worked to develop new digital services to help young people with mental health needs do self-management and access care	This project engaged frontline service providers and youth in workshops to understand mental health needs, build out ideas with Lego, storyboard new service ideas, and test versions of a new mobile app
The Contamination Free Room	The project explored the implications of changing the hospital bed, patient room, and backstage processes of the hospital to reduce hospital infections	This project involved staff from the County, private companies and research partners in observations and role play within patient rooms as well as interviews and workshops to test new approaches to patient rooms and beds within the hospital
Chronically Involved	This project worked to help patients with chronic disease become partners in their own care within primary care settings	This project engaged different primary care teams in doing data gathering, mainly through patient interviews, and then developing and experimenting with new approaches to service delivery that are more person-centered
Patient Journey	This project aim was to understand what happens, from the patients' perspective, when different systems, competencies, and people meet along the patients' journey	This project involved over two dozen healthcare providers that influenced the patient journey and engaged them reenactments, role-plays, journey mapping and interviews every Friday for eight weeks

Table AII.
The main Experio Lab service design projects studied

Appendix 5

Service design practices	Underlying codes	Illustrative quotation in text (Interviewee no, Quotation no)
Sensing surprise	Surprise	5, 1
	Using the senses	12, 1
	Triggers	1, 1
Perceiving multiples	Multiplicity	5, 2
	Sharing	12, 2
	Interaction	8, 1
Embodying alternatives	Enacting	13, 1
	Experimentation	14, 1
	New ways of working	12, 3

Appendix 6

Enabling condition	Illustrative examples from interviews, observations and archival data	
	Positive example	Negative example
Sensing surprise		
Intentional staging of a provocative situation	Care situations were set up for hospital staff to perform specific patient roles, which enabled staff to challenge their mental model of the patient experience	In one workshop, participants were mainly reflecting on their own experiences using post-it notes, but the environment did not prompt them to share new thoughts or information that challenged anyone's existing mental models
Coaching an actor to aid them in noticing new things	Staff from different departments in the hospital observed the process of tissue sampling with a design lead who asked them questions about what they saw, smelled and felt, which led to staff being surprised about the sampling process	When one clinical team was role playing different approaches to the patient experience, participants did not feel like they learned anything new, but they were not fully prompted at that time to reflect on the nuances of their different interactions
Actor's engagement and understanding of the context	Primary care staff did interviews with patients in their homes and seeing them in this context enabled staff to disrupt their own mental models about their own role in patients' lives	Staff spent a day walking through the steps of the patient's journey, but some staff who understood limited Swedish and whose work did not closely connect with the specific journey, did not engage enough to provoke any reflections on their mental models
Perceiving multiples		
Diversity of actors	Hospital staff from across clinical, information technology and lab departments that usually blamed each other for errors, were brought together to understand the dynamics around tissue sampling from the perspective of other departments	There were different staff present for the walk through of a patient journey, but no patients who had been through the process were able to be recruited so it was difficult for participating staff to apprehend the patient perspective in relation to the experience
Openness and safety of actor	Designers went for walks with individual caregivers, which enabled an intimate environment where caregivers could share their perspectives and the designers could understand their different mental models	Doctors were coloring in a silhouette of themselves and sharing their personal motivations, but in one workshop there was not enough safety within the team for participants to be vulnerable and share their perspectives with others on the practice of medicine
Visual and tangible tools	Participants' were invited to try out a two-way stethoscope where both the patient and the provider could listen at the same time. This constructed object helped providers reflect on the perspective of the patient and power dynamics of the patient–provider interaction	Staff reflected on post-it notes about how they could improve patient safety from different perspectives but found it difficult to draw insights out from the wall of words they had created
Skilled facilitation to support sharing	The dialogue started by listening to a patient story. Then the service designer facilitated a process of sharing reflections	The manager of the department did a lot of the talking at the mapping session, limiting the ability for the

(*continued*)

Enabling condition	Illustrative examples from interviews, observations and archival data	
	Positive example	Negative example
	and probed into participants conclusions, which enabled them to understand each other's mental models of the situation	patients and other staff to share their perspectives and hear the perspectives of others
Embodying alternatives		
Different context to explore possibilities	The design team went to an airport to understand the protocol for flight safety and this helped to inspire them to enact alternative approaches to patient safety	At the workshop in the administrative building, clinical staff felt freer to explore alternative mental models, but administrative staff had trouble getting outside of their regular ways of seeing and doing things
Supportive physical materials	Using a paper mock-up of an app, youth were able to walk through an alternative approach to the new clinical intake process and provide feedback	In one role play that was not supported with additional materials, participants hesitated to try out the different approaches to the doctor-patient relationship, saying that they felt silly and the role play did not feel real
Possibility for repetition and ongoing change in ways of working	In the different units that the doctor worked in, he had the autonomy over his own practice and was able to continue trying out new types of patient charts to guide his conversations with patients	The clinicians tried to spend time exploring new models for the clinic, but their colleagues did not support them taking so much time away from their regular practice so they were pressured to stop

Table AIV.

Appendix 7

Types of institutional work	Illustrative example from observations and archival data
Creating institutions	In the Chronically Involved project, primary care team members worked with patients to enact new ways of having conversations and new service offerings that helped establish patients as partners in their own care. In doing so, the primary care unit created new norms and helped to institutionalize a person-centered care approach within the clinic. This project also led to further work by participants involved to support large-scale implementation of the person-centered approach across healthcare contexts
Disrupting institutions	In the Patient Journey project, the experiences that hospital staff had role playing and reflecting on the patient experience contributed to eroding their professional roles and identities as they felt that their existing practices were not always aligned with a positive patient experience. This triggered participants to work toward changes in protocol within their units, shift their roles and advocate for policy changes within the hospital
Maintaining institutions	In the Test Tube Trip project, there was an awareness that some of the standards and protocols for tissue sampling were not being followed within the hospital. Through the service design process, different clinicians who did tissue sampling shared with each other how they did the sampling, what works, what does not and why they did what they did when sampling. A checklist was collaboratively developed to reinforce the proper protocol and a train-the-trainer model was set up for clinicians to educate other clinicians on the proper sampling approach.

Table AV.
Illustrative evidence of
institutional work

JOSM

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