

Faculty of Arts and Sciences Thesis No. 101

# Conceptualising Prototypes in Service Design

by

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**Linköping University**  
**FACULTY OF ARTS AND SCIENCES**

Submitted to the Faculty of Arts and Sciences at Linköping University in partial fulfilment of the requirements for the degree of Licentiate of Philosophy

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## ABSTRACT

To date, service prototyping has been discussed academically as an unproblematic add-on to existing prototyping techniques, or as methods for prototyping social interaction. In fact, most of the knowledge on how services are prototyped comes from organisations and practicing design consultants. Some attempts to define service prototyping have been made but generally without concern about how complete service experiences should or could be represented. Building on existing knowledge about prototyping, a draft of a service prototyping conceptualisation is generated. Based on the draft, the question of how to prototype holistic service experiences is raised and in total, 5 studies have been conducted that contribute knowledge to that overarching question. In addition, each study has its own research question. Study 1 conceptualises prototypes and prototyping in a framework while study 2 and 3 looks at what practicing service designers say they do to prototype services and how they involve different stakeholders in the process. Study 4 examines aspects of design communication and how service experiences are communicated and used during design meetings, and study 5 finally, attempts to generate a process that can be used to evaluate the impact of location oriented service prototypes in e.g. healthcare settings. A number of challenges for service prototyping are identified in the studies, along with the issue of who authors prototypes. The conceptualisation of prototyping is adjusted based on the studies and a framework is constructed that support the conceptualisation. Little evidence for holistic approaches to prototyping services is found in the interviews and service designers involve their clients primarily when prototyping. Service experiences are introduced in communication using a format termed micro-narratives. This format and the purpose of using references to previous experiences are discussed. The thesis is concluded with a suggestion of a process for service prototyping. This process is specific for service design and attempts to support service designers in making holistic service representations when prototyping. Service prototyping requires further research.

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A number of years back I started studying cognitive science and found it fascinating and inspiring thanks to teachers such as Arne Jönsson, Mikael Kindborg, Ulrich Olofsson, Mattias Arvola, Fredrik Stjernberg and more. However interesting, I never planned to continue in academia, but when I got the chance to take a master in design I still felt tempted to do it, in large part because of the teaching of Stefan Holmlid who made me want to learn and explore more in the area of design. The story repeated itself when I was nearing my graduation and was offered a chance to do a PhD under the supervision of Stefan. So without ever planning to pursue an academic career I was suddenly and haphazardly in the middle of writing this thesis.

Since I started my PhD, a little more than two years ago, I have had constant help and support from colleagues and friends. I cannot mention them all but will try to give thanks at least to those that have had the biggest influence on getting this work done. I have already mentioned my main supervisor Stefan Holmlid. Arne Jönsson also helped me focus my efforts and pointed me in the right direction. My secondary supervisor Robert Ramberg has been a great support and really helped me structure the process of writing this thesis, thank you. Thanks also to Sinna Lindquist for commenting on a draft of this thesis, Johan Åberg for advice and matching sweaters, my informants for interesting discussions, and Sture Hägglund for inviting me to the football team.

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# 1 Introduction

*“How do you prototype a service? You can’t really. Services are about relationships, and relationships take time to develop – compare that with a consumer product where the process is test-refine-test – it’s much harder to do a sticks and sellotape version of services.”*  
– Design student (Parker, 2009; p. 17).

How can we truthfully represent a service experience? This is the question that motivated this research and started the process of uncovering what service prototyping is and potentially could be. 5 studies have been conducted that contribute knowledge in different ways about what service prototyping can be. The research has been conducted with respect for the many different approaches to-, and conceptions of, both service design and prototyping at large. The research that will be presented should be seen as an early attempt to frame and conceptualise service prototyping where as many as possible of the approaches to service design is considered. During the two and a half years that the research has been conducted, very much has happened in the field, both academically and in the practicing community. New conferences have started, a minor explosion in the number of service design consultancies and government initiatives have occurred and service design has become something of a buzz word in the design community. But for the uninitiated reader, a short rundown of the terminology and basic assumptions within service design and prototyping will be presented here.

A service can be seen as a journey, a journey that, in most cases, consists of many stops along the way where a customer interacts with a service provider. We call such stops service moments. The journey can span from a couple of minutes, or even seconds to as much as a whole lifetime. The interactions at each service moment can look very different. It can be a conversation, an interaction with a web page, a phone call, and much more. These interactions are part of the production of a service, and without them, the service wouldn’t exist. Services take place all the time and as co-creators, by buying or using services, we are

all taking part in different services simultaneously. Most people don't think much about that because services are intangible – invisible and without surface. Service designers and researchers call the interactions with services touchpoints, indicating – quite ironically – that this is how the customer “touches” the service. While most design disciplines work with tangible design objects and projects with well-defined scope, service design aims to improve complete service experiences, across touchpoints and service moments, across physical spaces, virtual places, graphical objects and social interactions.

Designing all that at once and hoping to get it all right at the first attempt is a bit optimistic. What designers in other disciplines do to increase the chance of getting things right is to start building small, using prototypes, and then expand so that failures happen early and before the cost is too high. The word prototype roughly means a “first or primitive form” and comes from the Greek word *prototypos* which is a compound of the word *proto* “first” and *typos* “impression” (Harper n.d.). It is commonly believed that prototyping allows companies to arrive at better solutions that are more attuned to end-user needs and wants, to fail early when the cost is not as big and that prototypes help facilitate communication within and across stakeholder groups in design (Erickson, 1995; Schrage, 1996; Coughlan et al., 2007; Samalionis, 2009). Prototyping has been used successfully in design for a long time and is commonly mentioned in some shape or form in most design processes. This has led to the development of a large body of knowledge about prototyping – and how to make design practitioners benefit from prototyping.

Design and prototyping are no longer confined to interfaces and software, nor is it restricted to products and their functions, structures and surface properties. Holmlid & Evenson (2006) have claimed that the specific attributes of services makes prototyping special in a service context but that knowledge about how this is done, or should be done, is missing. The idea and the ways that services are different from products is persistently reiterated by the service design community, but studies that thoroughly explore the implications of those differences are not common. This is especially true for service prototyping. In other design disciplines, prototyping is regarded as an important part of evaluating and communicating ideas, both internally within the design team and externally with other stakeholders. Service prototyping should be no exception, but will probably need a specific structure and process that is different from traditional prototyping. Building up a practice of service prototyping requires a thorough understanding of services as design material and a firm base in existing design practice. Simply borrowing techniques and approaches from other design fields might be detrimental.

In service design, research is still young and developments in the field are very much driven by the community of practitioners. Insights from design practice are shared through case studies, blogs and homepages, and an active web community. Knowledge is shared through the Service Design Network (SDN), and conferences like SDN conference and the Nordic

service design and innovation conference, ServDes. From a research perspective we are also seeing more and more rigorous research and thorough investigations of how service design is practiced, how it is different from other disciplines, and what that means for people who design services (Holmlid, 2007; Kimbell, 2009; Segelström, 2010; Blomkvist & Holmlid, 2010; Blomkvist & Holmlid, 2011). This research will contribute knowledge in that general spirit of revealing what makes service design different from other design disciplines and approaches. A way to approach this topic, within a young field with such a close connection to a practicing community, is to look at what service prototyping is according to practitioners.

In total, 5 studies have been conducted that contribute to the understanding of service design and how service designers tackle the issue of service prototyping. *Study 1* is a literature study where a framework of existing prototyping perspectives is formed. The suggested framework serves as backdrop for the following studies. *Study 2* is based on interviews with practicing service designers and mainly concern answers to the question “Can you talk a little about how you actually make prototypes?” but also include other answers relevant to that question. This research will reveal the purpose for service prototyping and challenges for prototyping services as opposed to other materials. *Study 3* uses the same interview material but focus on questions of how stakeholders are involved in service prototyping by zooming in on the objectives, approaches, and techniques used by the interviewed service designers. In the interview studies (Study 2 and 3), a total of 6 designers from service design agencies answer about 30 questions concerning their work. *Study 4* examines how verbal descriptions or narratives are used in design communication as referential entities that complement or potentially substitute prototypes. *Study 5* finally, is conducted together with a service design agency and concerns the modification of an emergency ward waiting room. This study is more normative than the first four, and suggests a process for generating a tool that can be used to evaluate prototypes and make the hypotheses behind prototypes explicit.

These studies will allow us to understand service prototyping better and suggest improvements. Based on results in Study 2 and 3, the framework in study 1 is expanded with additional perspectives from a service design point of view. The resulting framework of perspectives for service prototyping is part of the conceptualisation of the practice. A suggested process for service prototyping, that to some extent is holistic in its approach, can also be deduced from the research and will be presented. But first a background chapter will help to frame and introduce the main theoretical issues in this thesis. In detail, these questions will be answered;

- What does design research say about prototyping and prototypes?
- What is service prototyping according to practitioners?
  - Definitions

- Purposes
- Challenges
- Approaches
- Inclusion
- How are prototypical experiences incorporated in design communication?
- How can service prototypes be evaluated?
- How can research improve service prototyping?
  - To what extent can existing prototyping knowledge be transferred to service prototyping?

## 1.1 Introduction references

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## 2 Background

It is possible that you are, at this moment, taking part in and interacting with a number of different services. Some, you are aware of (e.g. journal subscriptions, broadband, telephone subscription), but some might be totally invisible (e.g. tax monitoring, facility upkeep, mail delivery). Nevertheless, you are partaking in the execution of a number of services and by taking part in them you are actively influencing the delivery of the service. In that sense, services are co-produced by the service provider and service customer. This view can be contrasted with the traditional model of value exchange, where products or goods change hands instantaneously when they are delivered to customers. It is also possible to adopt a service-dominant perspective, rendering the distinction between what a service and a product is, of limited importance.

Even when you are aware that you are using a service, it is not uncommon to misunderstand who the actual service provider is, because services often exist in big ecologies. Service providers are interdependent, with quite intricate relationships where the actual performance of one service might depend completely on the successfulness of another service. At the same time, there are a lot of different ways to access most services and interact with service providers today. They might have an online web site, a phone number, and an office that all present their service proposition in different ways, allowing for different choices and also different opportunities for customers to provide feedback. This makes services complex.

This chapter will describe a movement in design towards larger considerations, more complex design situations, and the incorporation of experiences and services as design materials. The focus will be on service design and what makes services as design material special and what the implications for prototyping can be. A closer look at service

prototyping and what the history of prototyping can contribute to the discipline will provide a helpful background to both analyse and conceptualise the studies included in this thesis.

## 2.1 Design is changing

Traditional design disciplines are many times monotheistic regarding the object of design, i.e. they focus on one product, theme, artefact or “touchpoint”. Architects focus on buildings, product designers design single products or sometimes products as part of a series or brand, and within graphic design and crafts, designers usually produce single artworks, layouts, or objects, many times on a given theme or in relation to a specific topic. The design objects in these disciplines are tangible, consistent, and highly dependent on what material the designer decides to use. Unlike those disciplines, interaction design deals with a material that doesn’t have any specific properties (Löwgren & Stolterman, 2004), and on top of that will change over time. Within interaction design a progression has been evident, from a focus on closed-loop interactions between an isolated brain and an interface, to looking at the social, cultural, and embodied aspects of software and interface design. Today, terms such as communication design, social innovation, and service design indicates that the scope and focus of many design undertakings are changing.

This change of scope and focus is evident in a number of ways. One is that design is turning towards experiences and how to design (for) them (Buxton, 2007), which has led to increased importance of social and cultural considerations where products have gone from mere tools, that enable us to achieve certain goals, to vessels for social interactions. The focus on experiences has also led to new approaches for understanding those experiences, such as finding more empathic ways of discovering what users want and need on a deeper level. This has e.g. led to increased interest in ethnographic approaches to design (Salvador & Mateas, 1997). Along with changes in regard to the design material, the role of users in design has changed. Users and stakeholders are now said to be co-creators<sup>1</sup> in design.

A parallel development is the change in design objectives. Design has been criticised for losing touch with some of its core values and strengths, and associated by some with too much of a monetary agenda and consumerist approach (Thackara, 2005; Sanders, 2006a). Products are becoming cheaper and easier to develop which also leads to sustainability problems linked to over-production, with more and more things being produced just for the sake of production. The argument has been that we should turn our focus away from things, and instead focus on human activities, desires and experiences (Thackara, 2005). Service

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<sup>1</sup> In design, co-creation often means the inclusion of different stakeholders, such as customers or front-line staff, in the design of preconditions or propositions of services. This process or activity is referred to as co-production in e.g. service management. Co-creation in service management and marketing on the other hand, refers to the actual service transaction where customers and service providers interact with each other. In this thesis, co-creation is used in the design sense of the word, i.e. involving stakeholders in the process of designing for service.

design has partially emerged as a reaction or answer to this view, and can be seen as a result of the changes and trends within the design community.

## 2.2 Service design

It is generally assumed and argued that designing services can have a number of positive effects on companies' revenues and customer relations; "[t]he design of a service can have a significant impact on any of all of an organization's key metrics, including costs, revenue, brand perceptions, customer satisfaction and loyalty, and employee satisfaction and loyalty." (Ostrom, et al., 2010, p. 17). Despite this, service design has not been considered a design discipline for long. Before the emergence of design-based service design the term service design – when mentioned – referred to a sub-section of the marketing, managing, or development of services in a service research context. In 1989, the service management researcher Evert Gummeson said "[w]e have yet to hear of service designers" (Grönroos 1990, p. 57, in Kimbell, 2009b), and he didn't have to wait for long (see Blomkvist et al., 2010), though it would take almost a decade before the first service design agency was founded in the early 2000's. Initially, service design as an activity performed by designers (calling it service design), was exclusive to a small community of practitioners.

As a research field on the other hand, it has been claimed that service design emerged as a result of ".../ the awareness of the lack of an organic and autonomous design culture in contrast with the dominant economic vision of service section and the consequent demand for more conscious design shapes" (Maffei et al., 2005, p. 1). Academic research in service design started in the early 1990s (Blomkvist et al., 2010; Manzini, 1993), and has since mainly stood on two legs. This has been a consequence of the dominating influence in the field from design researchers and service researchers (see Segelström, 2010). The design influence has mainly come from interaction design which has a number of similar characteristics in regard to design material and approach (Holmlid, 2007; Holmlid, 2009).

A number of different perspectives on what service design is – or should be – have emerged during the early years of service design. Sangiorgi (2009) has suggested a distinction between different perspectives on service design, claiming that there are three different perspectives. Looking at service design;

- as designing the service interface,
- as designing the co-creation of value between complex systems, or
- as designing platforms for action.

These approaches to service design can be traced back to different design traditions and they should have significant implications for the output of design activities. In service design, services are also often thought and talked about as journeys. "Services are processes that happen over time, and this process includes several service moments. When all service

moments are connected the customer journey is formed.” (Koivisto, 2009, p. 143). The journey metaphor and the theatre metaphor are underlying and (partly) conflicting frameworks behind the two most commonly mentioned tools in service design, customer journeys (Parker & Heapy, 2006) and service blueprints (Bitner et al., 2008; Shostack, 1982; Shostack, 1984). Customer journeys follow a customer on the journey through a service, visualising the experience in more or less detail and with different levels of fidelity. Service blueprints show actors placed on a stage with different roles and actions. The blueprint representation focuses on processes and can be used to make a representation of a service from an outside perspective. Using these tools set service designers apart from other disciplines because they include whole services, not just interfaces, products or parts of the experience. In this sense, the view of services is pluralistic. Services are not seen as one thing, rather a lot of different things that all need to be considered in a holistic manner.

### **2.2.1 Service as design material**

The difference between services and products has been investigated closely – and emphasised – by the service research community. One of the most commonly mentioned characteristic of services in service design is intangibility, the fact that services are immaterial and cannot be perceived. Intangibility is part of a figure of thought within service marketing and management, where the characteristics of a service many times have been described using all or some of the four characteristics; intangibility, heterogeneity, inseparability, and perishability (Lovell & Gummesson, 2004; Zeithaml et al., 1985). When services are seen as design objects, these components might be of interest since many of them also separate services from other design materials. Intangibility is shared to some extent with interaction design, though the visual component of most interfaces is different from services. Heterogeneity refers to variability in service delivery associated with different individual behaviours, moods, and preferences. Services require people to be involved and that makes the delivery, and thus the experience of the service, different each time. Inseparability of consumption and production is another issue related to the two characteristics mentioned above. The service does not exist until it is delivered and depending on who the customer is, and in what way the service is delivered, it will be coordinated and produced – on the fly – in different ways each time. The last characteristic, perishability, says that services, unlike products cannot be stored or pre-produced and consumed at a later time. This focus on the dichotomy of services and products has largely been replaced by a service-dominant view (Vargo & Lusch, 2004; 2008), but for service design it might be helpful to think about what services are, what affects the experience of services, and what can be designed in a service. A central concept related to what can be designed in a service is servicescape, and the properties of physical surroundings that affect service experiences.

### 2.2.2 Servicescapes

Service experiences that occur across multiple stakeholders, and over time, are affected in numerous ways. The physical surroundings of a service have been called *servicescapes*, in which cognition, behaviour, and experiences are influenced by the following dimensions (at least);

- ambient conditions,
- spatial layout and functionality,
- signs, symbols, and artefacts, and
- service typology and environmental dimensions. (Bitner, 1992).

*Ambient conditions* include factors that affect “perceptions of and human responses to the environment” (Bitner, 1992, p. 65). Examples include temperature, lighting, smells, noise and the like that effect the five senses. As such they are not always consciously registered by people but still affect them to a large extent. *Spatial layout and functionality* represent the physical artefacts, their placement and relation to other objects in the room, and how well they allow people to fulfil their goals or mediate their actions.

*Signs, symbols, and artefacts* are communication signals that direct the attention and inform users in the servicescape. The quality (material) of these communication labels and signs affect the overall impression of users. Also materials that are not explicitly meant to communicate a message, contain information that are interpreted by users. *Service typology and environmental dimensions* roughly concern the total configuration of the servicescape. Even small changes in the environment have implications for behaviours, such as changing the flow of transactions and supporting certain types of social behaviours. (Bitner, 1992).

One cannot always consider all of these aspects of servicescapes when designing a prototype, but some aspects might be more important not to overlook than others, and sometimes unforeseen details might mean the difference between a successful implementation and total failure. Servicescapes are not interesting for all types of service design. For instance, some services do not occur in specific locations and are not as influenced by physical surroundings as others. One problem with most conceptions of service design is that services are lumped together, though they are vastly different many times. This means that when knowledge is shared within the community of service designers and researchers, insights from projects are shared under the assumption that the knowledge generated about certain services can be transferred directly to other types of services. A way to deal with this issue is to be more specific when it comes to what kind of specific tools, approaches, techniques, and methods have been useful within a specific service category.

### 2.2.3 Classifying services for service design

So far, there has not been a classification of services specifically for service design. Classifications have mainly focused on categorizing services in ways useful for management and marketing of services. Looking closer at existing classifications might however offer clues to what a typology for design might look like. Existing classifications have many times been too general. As stated by Kimbell (2009c, p. 3) “[s]ervices are typically conceived of as what products are not.” Other authors call for a more nuanced conception of services than that (Vargo & Lusch, 2004). Cowell (1980) suggested that a way of approaching a categorisation of services is to decide whether to consider them from a *seller* based, *buyer* based, or *service* based perspective. In a similar fashion, Lovelock (1983) suggested that a useful approach is to segment services into groups with common characteristics such as “the nature of the relationship between the service organization and its customers or patterns of demand relative to supply”. (p. 9). In line with that Lovelock (ibid.) suggested five questions as a basis for his classification:

- What is the nature of the service act?
- What type of relationship does the service organisation have with its customers?
- How much room is there for customisation and judgment on the part of the service provider?
- What is the nature of demand and supply for the service?
- How is the service delivered?

When dealing with service locations and facilities, Bitner (1992) has used the fifth question and the dimensions suggested by Lovelock (1983) to classify services for design. The service types in the typology are based on who performs actions.

- Self-service (customer only)
- Interpersonal services (customer and employees)
- Remote service (employee only)

The categories are divided further into *elaborate* or *lean* services in terms of complexity of what Bitner called servicescapes (see Figure 1). This is a good typology for location oriented services, i.e. services that are delivered in a specific facility or a certain location, though it does not explain how to design an environment to achieve specific goals. Bitner (1992) has however suggested a framework also for how environmental factors invoke cognitive,

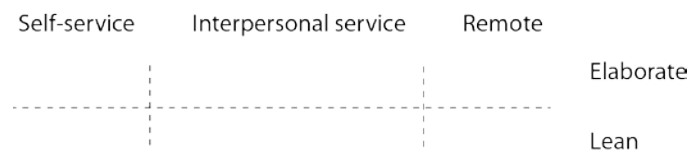


FIGURE 1: SERVICE CLASSIFICATION BASED ON HOW A SERVICE IS DELIVERED, ADAPTED FROM (LOVELOCK, 1983).

emotional, and physiological responses in both customers and employees. The basic assumption is that dimensions of the servicescape influence the behaviour of people in one of two ways; approach or avoidance behaviours (ibid.). Any of the behaviours can be the result of the design of environmental factors for each dimension and for both customers and employees. The work by Bitner (ibid.) is seminal and potentially helpful for service designers but perhaps best suited for commercial services and a little too academic to be directly applied in practice.

Lovelock (1983) motivated his comprehensive work on classifying services by arguing for the value of categorisations in service marketing. A measure of the usefulness of such categorisations is whether they provide strategic insights. Lovelock (ibid.) reported on a number of benefits with categorising services such as:

- obtaining a better understanding of consumer needs and behavior,
- providing insights into the management of retail distribution systems, and
- providing important guidelines for retailers.

It is interesting to think about what a good categorisation could look like for service design. A brief consideration suggests that it should help designers find good solutions and improve the understanding of the relationships between the customers *and* the service providers. Dividing services into who sells or buys them would put unnecessary focus on one or the other. A categorisation could also help designers find and analyse competitors in relevant categories and specialize or generalize their offer in a specific segment. One important aspect is that a categorisation should support design communication, both internally and externally, by offering a sensible way of separating services. Being more specific about the vocabulary ensures that we know what we are talking about and helps reason about services in a more constructive way. It can arguably also help us understand the connections between design elements and different groups of stakeholders better. Categorizing in design can help to support a common language within fields, but it can also be used to support idea generation within genres (Arvola et al., 2010) and to facilitate innovation by showing fields that are close and have similar types of issues and opportunities (Ulwick, 2005).

Kimbell (2009c) has provided a description of services and how they are generally conceived. She considered whether services are one thing or many, and divided services into traditional, knowledge-intensive and professional. Kimbell also suggested that “services are diverse in terms of where they happen, the level of skill and organizational complexity involved in designing and delivering them, the extent to which the experience of a service is an important part of the value added, the involvement of people or technologies, and the extent to which a service can be customised and personalised.” (2009, p. 3). Cautela et al. (2009) on the other hand, have suggested a categorisation for service design based on Gummesson (2007) where services were divided into

- *“interaction based services*, in which services admitting a sole transaction with only one actor interface fall;
- *relationship focused services*, in which services that admit multiple repeated transactions with the same actor-interface are counted;
- *network centred services*, in which services characterized by different transactions done by different actors can be identified”. (Cautela et al., 2009, p. 4321)

This categorisation however does not clearly define services from multiple perspectives such as the customer-employee relationship and where the service happens, but rather focuses on the level of complexity of the service. While the complexity of a service is important for service design, the type of complexity might say more about the category of service. A first, tentative way to categorise services are presented in the Method chapter (3.5.1) where the process of categorising a specific service is exemplified.

#### **2.2.4 Inclusion in service design**

A key to inclusion in service design is said to be co-creation. Though a word often thrown around, the meaning of co-creation is still not clear and there is some confusion about how it is actually done (Sanders, 2006a). The fact that the word is used in different ways in different fields of research doesn't make things easier. The think tank Demos have produced a number of helpful texts on this topic, and provided what they call a definition of co-design with the main claims related to participation being that it is; 1) collaborative, 2) transparent in regard to methodology, 3) continuous in regard to participants and 4) welcoming input from a multiplicity of viewpoints (Bradwell & Marr, 2008). This thesis touches upon the issues of what kind of collaboration is involved in service prototyping, the continuity of participants and the number of different stakeholders involved. The claim that the process needs to be transparent is often mentioned in literature and the reason is that in order to collaborate effectively, all involved stakeholders need to have access to similar information and a common understanding of the activities and their purposes (Andriof & Waddock, 2002; Bradwell & Marr, 2008; Han, 2009). One way of making design work and the process more transparent is to use prototypes at different stages of the design process. To facilitate cooperation, prototypes in themselves must also be made so that different audiences can understand and evaluate the prototypes.

The concept of co-creation, in the context of collaborative design approaches, is sometimes used in contrast to other approaches such as genius design or expert design where the designer can be seen as a black box with an opaque process that does not include others; only the result of the process is visible. The roles of clients and users in such approaches are constrained to that of passive informants or sources of inspiration that act as a target for design activities. This role however, is slowly changing. Designers increasingly have involved non-designers in their practice, and academically there has been increased interest in cooperative design practices, resulting in publications, e.g., on how to involve stakeholders



to improve design outputs, conditions for making involvement possible, etcetera (Brandt, 2006; Mattelmäki, 2006; Gaver et al., 1999; von Hippel, 2005). This trend is often attributed to the influence of participatory design (Bødker, 1996; Carroll & Rosson, 2007; Ehn & Kyng, 1992; Holmlid, 2009) which fundamentally changed the relation between designers and stakeholders back in the 1960s and 1970s (Sanders, 2006b).

### 2.3 Research about service design practice

A number of current trends in service design research have been identified, based on an overview of peer-reviewed papers published during 2008-2009 (Blomkvist et al., 2010). The trends were described as research about 1) design theory, exploring the fundamental questions of service design, the language of service design and co-creation, 2) the overlap between and contribution from service management, 3) systemic approaches to service design, such as product-service systems, 4) design techniques, such as tools and processes and 5) the practice of service design researched through case studies. The trends were used to contrast recent research with older research which focused mainly on how the discipline relates to other (design) disciplines and arguing for service design in its own right (ibid).

In total, six case studies were published during the two years covered by the study. The emergence of empirical studies of service design is contemporary with the breakthrough of the discipline as a whole (Kimbell, 2009a). Extensive research about the practice of service design has been conducted by Lucy Kimbell in the project Design for service in science and technology-based enterprises (Kimbell & Siedel, 2008), covering the practice of three design consultancies that work with services. Kimbell's (2009b,c) work has shown a number of interesting features that characterise the practice of service design. They are summarised and presented below.

- Looking at services from both a holistic and detailed point of view.
- Considering both artefacts and experiences.
- Making services tangible and visible through visualisations.
- Assembling sets of relations (between artefacts, people and practices).
- Designing business models.

An ambitious case study, looking at the practice of service design by 17 design agencies, consulting firms and experience-centric service providers (Zomerdijk & Voss, 2010), reported similar results as Kimbell (2009b,c). The result shows that the broad sense of designing services – not only carried out by actual designers – concerns the delivery of physically and socially mediated touchpoints through interactions between the customer and a strategic front-line and backstage system. In addition, the study found that the studied companies to some degree 1) designed the dramatic structure of events and 2) managed the presence of fellow customers (Zomerdijk & Voss, 2010). The evidence of 1 was most obvious in companies with design backgrounds that more easily adopt the theatrical

metaphor, and for 2 they found only limited evidence (ibid). The studies performed by Zomerdijk, Voss and Kimbell concern the practice of service design on a general level and the distinguishing features of what service designers do. More focused studies, looking at specific activities in service design or at the activities that are shared by other disciplines are still uncommon. “Until recently research regarding design with a service perspective as well as services with a design perspective has been scarce. Many fundamental aspects of service design are still unexplored academically.” (Segelström & Holmlid, 2009, p. 1).

Other researchers (Segelström & Holmlid, 2009; Segelström, 2009) have looked more closely at how service designers visualise research material. This research was based mainly on interviews with service designers and supports the idea that visualisations are important for the practice of service design by showing that visualisations are used

- as communication tools,
- to preserve empathy within the design team and
- to make insights tangible (Segelström, 2009).

It also showed that visualisation techniques are important for service designers and facilitate the early research stages of the design process (Segelström & Holmlid, 2009). The research by Segelström and Holmlid mainly cover the early stages of service design projects. The research presented in this thesis however, attempts to contribute knowledge about the later stages. Also considering Kimbell’s work, it is still unclear whether prototyping is a priority in service design and how it is practiced. This thesis also attempts to investigate whether prototyping really is part of the generic service design process and if so, how it is done.

## 2.4 Prototyping

A prototype is a “first or primitive form” and the word comes from the Greek word *prototipos* which is a compound of the word *proto* “first” and *typos* “impression” (Harper n.d.). The word has been used in many different contexts and disciplines and is used within design for various purposes. It is commonly believed that prototyping benefits the design process and output. Prototypes can identify problems early to save money (McCurdy et al., 2006). Prototypes are said to be especially important when the design space is complex and fuzzy since clients and other stakeholders might have a hard time understanding the progression and usefulness of different activities in the design process without them. Tangible things, such as scenarios, visualisations and other representations provide security for stakeholders (Jégou & Manzini, 2008; Parker & Heapy, 2006); and facilitate communication (Erickson, 1995; Schrage, 2004; Segelström, 2009; Samalionis, 2009). In short, having some external representation provides a common reference point that allows stakeholders to collaborate and evaluate design suggestions.

In design, all prototypes are arguably part of a subset of representations, all of which are especially important in design fields that work with intangible objects, such as (partly) interaction design (Holmlid, 2007) and service design. Long before the term prototype was used in software development, where it has had big impact, it was used in a design context in the shape of architectural models to provide early and inexpensive insights into the impression of a building's structure and in product and graphic design (Wong, 1992). As noted by Holmquist; "representations in interaction design rest on a foundation of practice developed in fields such as product design and graphic design." (2005, p. 50). The word prototype also has different meanings in different disciplines and besides the more general meaning of the word as the most typical or representative instance of a category, it is also used in cognitive science and linguistics with a similar meaning to denote a graded categorisation mode. To understand the role and purpose of prototyping it is useful to look at the evolution of prototyping in one of the fields that has influenced the approach to service design; information systems and interaction design.

#### **2.4.1 A history of prototyping in information systems**

Before the introduction of the term interaction design in software development, knowledge about prototyping was mainly generated in the field of information systems and in 1982 Naumann & Jenkins wrote: "[a] quiet revolution is taking place in the information systems industry. Trade publications, academic journals, and advertisements are filled with references to 'prototyping' for systems development." (Naumann & Jenkins, 1982, p. 29) and "[u]sers of these terms are each describing a nontraditional approach to systems development." (ibid., p. 40). Prototyping at this point was something new and something different than the activities that had previously been associated with the development of information systems.

In software development, research into prototyping started as an academic idea that was later spread to practice in a successful way (Budde & Züllighoven, 1992). The origin can be traced back to 1977 where the technique was introduced in pedagogical terms: "[i]n the prototype strategy, an initial and usually highly simplified prototype version of the system is designed, implemented, tested and brought into operation. Based on the experience gained in the operation of the first prototype, a revised requirement is established, and a second prototype designed and implemented." (Bally et al., 1977, p. 23). The technique was presented and introduced as a complement to linear, loopy linear and plug-in strategies to software development.

Later on, in 1986, prototyping had matured a bit. "During the past few years there has been an ever increasing awareness that a static paper description of a computer-based information system, however formally specified or rigorously defined, is far from adequate for communicating the dynamics of the situation." (Mayhew & Dearnley, 1986, p. 481). During the 1980s the research questions concerning prototyping was mainly conceptual,

prototyping was researched from perspectives such as “How is prototyping related to more traditional approaches?“, “What are the types of prototyping?” and “How should one apply prototyping in different contexts?” (Ilvari & Karjalainen, 1989, p32).

During this period there were also a number of attempts at categorising and classifying the different types of prototypes, mainly in regard to their purpose. Floyd (1984) suggested the three categories; exploratory, experimental, and evolutionary. These were later expanded and revised by Law (1985, in Mayhew & Dearnley, 1986) and by Mayhew & Dearnley (1986) using the tetrahedron shaped “PUSH” (Prototyper, User, Software, Hardware) model of prototyping; see Figure 2a, with clear parallels to later work by Houde & Hill (1997) in Figure 2b. Mayhew & Dearnley noted that prototypes help make the assumptions behind prototypes explicit. Mayhew & Dearnley reported that practitioners had to ask themselves questions that “concerned the aim of building each prototype, the category it fell into, [and] the appropriateness of using particular types of prototypes at certain stages of systems development” (1986, p. 481).

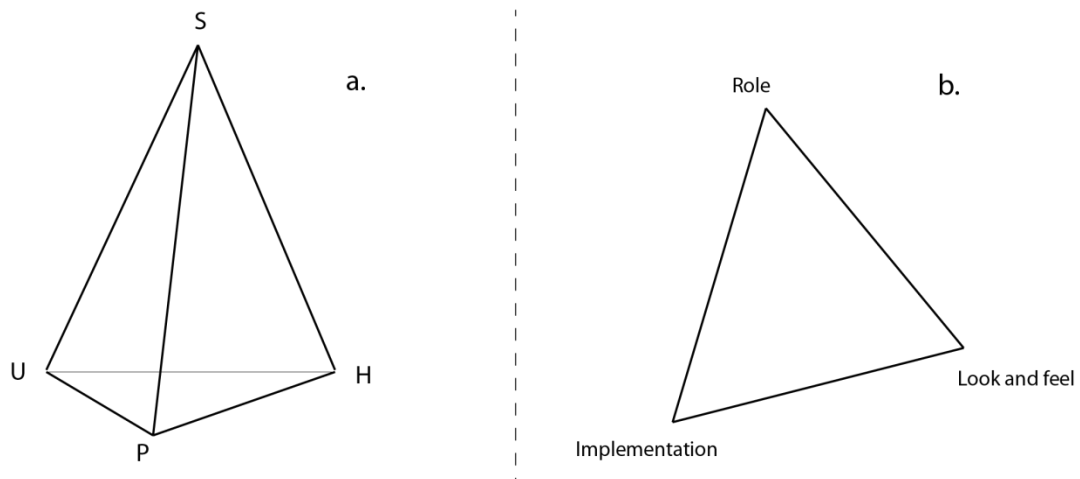


FIGURE 2: A: THE PUSH MODEL, ADAPTED FROM (MAYHEW & DEARNLEY, 1986); B: A MODEL OF WHAT PROTOTYPES PROTOTYPE, SUGGESTED BY (HOUDE & HILL, 1997).

Prototyping has gradually formalised itself into a well-known practice after a lot of initial classification and framing, not to mention questioning of its usefulness and benefits. In the early 1990s, some of the initial enthusiasm had settled and it was believed that “[o]ver the past ten years, prototyping has developed from a buzzword to a valuable software construction concept within a general strategy for system development.” (Budde & Züllighoven, 1992, p. 97).

Most suggested classifications have been part of an attempt at classifying prototypes in themselves and not so much about classifying and categorising the approaches to-, or the activity of, prototyping. The first 20 years or so were mainly concerned with conceptualising the approach and many of the ideas from the earlier days of prototyping have survived into the new millennia (2000). The main concern have perhaps been with the concept of fidelity,

where no clear consensus exist even today (McCurdy et al., 2006). In all though, knowledge about prototyping appears to have withstood both time and academic scrutiny. Also the practice and application of the knowledge has survived and is now firmly rooted in the approaches utilised by software designers.

New techniques and approaches were continuously developed after the initial introduction of prototyping in the field. Techniques like rapid prototyping (Zelkowitz, 1980) and paper prototyping (Ehn & Kyng, 1992) were quite quickly developed. These are techniques that laid the foundation for more recent prototyping approaches and methods which largely influence service design. Finding a prototyping process or approach that is specific for service design however has not been done yet. However, it is interesting to look at what attempts have been made and what they encompass.

### **2.4.2 Prototyping in service design**

Though prototyping is recognised as an important part of most design disciplines, it might be even more important for service design. Reasons for this are the attributes of services as design objects (i.e. intangibility, heterogeneity, inseparability, and perishability). The core of the problem is shared with all disciplines that ultimately try to design for human experiences “as they are not only intangible but also inherently unique and personal” (Voss & Zomerdijk, 2007, p.22). Also in actual delivery of services there is a problem of intangibility, since it is not always obvious that a service is being delivered e.g. roads, traffic signs, taxes, and so on. In service design this problem is approached through service evidencing – providing evidence that the service is being delivered, or has been delivered (Shostack, 1982). As we have already seen, services are also pluralistic in the sense that more than one touchpoint or service moment generally is the object of design. This has implications for how services theoretically should be prototyped to deal with the complexity of services, and for how people should be included in prototyping practice. “While ‘scaling up’, Service Design is also ‘reaching out’ and ‘deepening in’; this means that when both the complexity of challenges and the objects of design become larger, design needs to collaborate with a wider number of stakeholders and professions, but also to work ‘within’ service organisations and users communities to provide tools and modes to deal with change and complexity on a daily basis.” (Sangiorgi, 2009, p. 415). Prototyping approaches are part of the tools and modes that service design can offer service organisations and companies to deal with this complexity.

Prototyping seems to be little known within service management and marketing. In the book by Hollins and Hollins (1991), concerning the management of design in services, very little is mentioned about prototyping and the role of prototypes; prototyping is mentioned in passing as part of the implementation stage. Naturally there are many areas in such a young discipline as service design where research is missing. So far, knowledge generated in the service design community about the activities in service design has focused on a number

of different areas. Going through service design literature Blomkvist et al. (2010) cited 66 sources of mainly peer-reviewed material early 2010. None of the sources explicitly concerned implementation or prototyping of services. Instead, the research made in the field mainly focus on earlier stages, involvement strategies and idea generation. Research about the later stages of service design is sparser and service prototyping is one area where research is missing.

Though the potential in service prototyping has been mentioned, the actual practice is yet to be revealed. “Although methods for expressing important characteristics of a service have been widely used, the understanding of how these can be used to prototype services is lacking. It is often stated that prototyping a service experience could potentially contribute to higher quality services, more well-directed service engineering processes, etc.” (Holmlid & Evenson, 2007, p. 1). Prominent service marketing and management researchers at the Arizona State University’s centre for Services Leadership have compiled a list of 10 interdisciplinary research priorities (Ostrom, et al., 2010), where two of the priorities were;

- stimulating service innovation and
- enhancing service design.

According to the text, one important topic for stimulating service innovation is “[u]sing modelling and service simulation to enhance service innovation” and the author Haluk Demirkan claimed that most companies still are stuck with the “invention model” of innovation, “centered on structured, bricks-and-mortar product development processes and platforms” (ibid., p. 15). When it comes to enhancing service design, Mary Jo Bitner specifically pointed out service prototyping as one of the areas where research is needed “/.../ to deepen and creatively expand knowledge of design methods and tools, such as service blueprinting, service prototyping, and service simulation models, variations of which have been developed within several disciplines” (2010, p. 18). Prototyping and simulation can thus be considered areas where more knowledge is needed to enhance service design and innovation. Some of that knowledge can be found in other disciplines with similar aims, and this topic will be revisited in Study 2 in this thesis, contributing additional knowledge to the area.

### **2.4.3 Early attempts to frame and define service prototyping**

Some rudimentary definitions of service prototyping exist, like the one suggested on the online repository for Service design tools (2009), a project aimed at identifying communication tools for design processes in complex systems: “[service prototyping is a tool] for testing the service by observing the interaction of the user with a prototype of the service put in the place, situation and condition where the service will actually exist.” The same definition is basically reproduced in academic reports from the project but adds that: “[t]he difference between this kind of simulation and all the others is the attention paid to

the external factors that could interfere with the service delivery, factors that have a great impact on the user experience.” (Diana et al., 2009, p. 8) In essence, this definition implies that any prototype that is tested in the intended “place, situation and condition” is a service prototype. The data behind the work was collected via several case studies, existing literature and interviews with designers and academics, and focused mainly on different types of visualisations.

Another description focuses more on the emotional impact and the business side of service prototypes. According to Jeneanne Rae (2007) from an innovation management viewpoint, service prototyping helps in gaining a competitive advantage and reduce risk. She has also said that: “[g]ood service prototypes appeal to the emotions and avoid drawing attention to features, costs, and applications that can clutter the conversation and derail the excitement factor. Storytelling, vignettes, cartoons, amateur videos—all are low-budget tools that bypass the intellectual ‘gristmill’ and go straight to the heart.” (Rae, 2007).

The exact meaning of service prototyping is not mentioned by Rae, though it is described as a collaborative, explorative, iterative and open-ended activity. Miettinen (2009) exemplifies a quite different approach to service prototyping. In her work she has stated that; “[s]ervices are usually prototyped through scenario-building and role-playing.” (p. 4512) and in the specific case she described, prototyping was also placed in a real-life environment. The actual process and meaning in Miettinen (2009), about what service prototyping is meant to imply is unclear though, and the question remains what service design practitioners do to prototype services. In conclusion to this section it is clear that service prototyping has been described in a variety of ways and is mentioned in academic literature as an area that needs more investigation.

## 2.5 Approach and purpose of the thesis

It is important for two reasons that this research is grounded in design practice. First of all the connection to the practicing community is close, as it is in many design disciplines. Secondly, and perhaps more importantly, the field is young and very little is actually known about what it means to be a service designer and about the activities associated with prototyping services in particular. The mistake of not paying thorough attention to the practice of design, and basing research on assumptions that have not been properly grounded in practice, has been made in the past; “one reason why HCI research (aimed at supporting design practice) has not (always) been successful is that it has not been grounded in and guided by a sufficient understanding and acceptance of the nature of design practice” (Stolterman, 2008, p. 56). According to Stolterman, this led to a situation where methods and techniques were borrowed in from other fields that were not appropriate for design practice “even though they may be successful in their respective ‘home’ fields or in research settings.” (ibid.) It has however also been claimed that “the development of [service design] seems to be mainly driven by and through a reflection on what practitioners do. This results

in a strong emphasis on methodologies, with less focus on the development of foundational theoretical frameworks.” (Sangiorgi, 2009, p. 418.) This quote might seem to counter the argument that we lack an understanding of what service design practice is but the assumptions about practice is mainly based on practitioners’ own accounts of how they work. At the moment there are a lot of assumptions about what service design is and how it is practiced. Critical examinations of those assumptions are scarce and should arguably come from design researchers, and not from the practitioners themselves.

To find out what service prototyping is, a number of different approaches can be imagined. A common characterisation of design research is to divide it into research *about* design, research *in* design and research *through* design (Frayling, 1993). The research presented here is part of a larger attempt to map out the practice of service prototyping, mainly focusing on research about design. In this case that means that the research is focused on interviews with- and observations of -practicing service designers. The research mainly aims at describing prototyping through the words of design practitioners, revealing their own conceptions of service prototyping. Various approaches have been used. Study 1 was based on a literature overview while Study 2 and 3 mainly used the same interview material as data source, Study 4 was a result of a communication analysis of recorded material from design meetings, and finally Study 5 mainly used interviews with designers to figure out a process for developing an evaluation tool for service prototypes. This means that in large parts, the aim of the research from Study 1-4 is descriptive – it is to describe what service prototyping is, not to generate new approaches or methods primarily. Study 5 however can be seen as more of a normative approach where a process is suggested.

The thesis will result in an early description of what service prototyping is from a theoretical and practical stand-point. The guiding question throughout the research process has been how to represent service experiences holistically. The thought that this should be possible for service prototyping finds ground in claims that service designers work with complete service experiences and arguments e.g. that an approach from a service design perspective would see all “interfaces or ‘touchpoints’ with the customer (or the end user) as something to be thought of holistically, and it would seek to offer an intentionally-designed experience of the organization.” (Kimbell, 2009c, p. 2-3). If this is the case, then prototyping should offer insights into experiences that reflect all, or as much as possible, of the parts of a service – whatever they may be.

The individual contributions of the studies in this thesis should answer different questions that relate directly to this overarching goal. The literature study (1) should provide an understanding of knowledge generated about prototyping and a framework of service prototyping perspectives that help conceptualise the field. The interview studies (2 and 3) should reveal what service prototyping is according to service designers and how service designers say they involve different stakeholders that affect, and is effected by, the service



experience. A closer look at how service experiences are used in design communication (Study 4) should contribute knowledge about the structure of such contributions and what role previous service experiences plays in design teams. The last study (5) reports from a case that provides insights about how to measure the impact of service prototypes. The aim is that this should result in a better understanding of service prototyping and by doing so, suggest ways of improving the practice. Based on those improvements, a new process that captures a large part of the complete service experience should be possible to generate. The studies are based on papers that have been published elsewhere and then re-written to better fit the purpose and content of this thesis.

This thesis mainly concerns service design as practiced by consultants that depend on different clients to get funding and projects to work with. This excludes the practice of government funded, many times academically and research oriented, service design. It also excludes other types of research organisations and their preconditions and motivations for doing service design. The focus on service design as practiced by consultants does however not exclude projects that are paid for by public organisations, as long as the consultancy is not completely supported by such organisations. The difference is whether the consultancy depends on constantly signing new deals with different actors to be able to continue their work. This group is especially interesting since they many times do not have a voice of their own in academic contexts, while other approaches many times have channels to communicate their insights. These insights however, arise under different and less pressing circumstances that many times allow them to experiment and explore different aspects of their field to a larger extent.

The results and ideas in the thesis are mainly intended to be useful for two categories of audiences; service design researchers and service design practitioners. For researchers this thesis adds a piece to the puzzle of what service design is and can be used as a basis for further investigations into more specific areas of service design. It also complements much of the existing research about service design in the sense that later stages of service design is covered and that it is based to some extent on reports by actual design practitioners. For academics, the thesis can also be used to inspire and inform choices when it comes to the teaching of service design. For service design practitioners the thesis might have less to offer but can be used both as a starting point for discussions as well as a suggestion for how to approach prototyping in their projects. Study 5 will also have a specific focus on developing a tool that can be used by practitioners that want to evaluate service prototypes and be able to show the benefit of prototyping. Secondary audiences include design researchers in other disciplines and researchers from service marketing and management. Design researchers might be interested in the framework that will be suggested in Study 1, which is also further developed in the Discussion chapter (9.1) of the thesis. Service researchers is another category that might be interested in general findings and knowledge about the working ways within the more and more significant and influential discipline of service design.

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## 3 Method

The different studies in this thesis reveal knowledge related to the individual research questions. Each sub-chapter in this chapter describe the approach and method utilised in a study. Through five different excavations in the service design landscape this will help us gradually arrive at a first distinct and specific prototyping process for service design.

*Study 1* takes a look at the existing body of literature about prototyping generated mainly in the systems design field. This is motivated by trends and developments in the design field. The aim is to conceptualise contemporary prototyping, make knowledge about prototyping explicit, and to build a firm ground for further research about prototyping in new disciplines such as service design. It does so by identifying a framework of perspectives for prototyping that reveal what the existing toolbox of prototyping contains based on a literature overview. Going through published literature from the early 1980s and onward, the framework is constructed. *Study 2* contributes knowledge about design practice. It focuses on practicing service designers and their conceptions of what service prototyping is. The main data source for the study is in-depth interviews with 6 service designers from some well-known agencies. The designers answer questions about how and why they prototype services, what the main challenges for service prototyping are, what techniques they use, and the scope of their prototypes. *Study 3* uses the same interview material to reveal what designers say they do to involve different stakeholders in the process of prototyping services. The study focuses on the questions of “who is involved in creating prototypes”, “who evaluates the prototype” and how “the clients [of the design agencies] are involved”. The study makes a distinction between different types of involvement based on previous literature which characterise different roles and perspectives on inclusion in design.

*Study 4* shows how designers deal with previous service experiences in design communication to complement other representations, such as prototypes. It does so by showing how these experiences are introduced in discussions between stakeholders in design communication. Most research in other fields has concerned how surface properties of exemplars have been incorporated in current designs, but services are different from most

other design disciplines in regard to material. The study expands our knowledge about exemplars by a study of material from recordings and observations of design meetings. *Study 5* finally is a study that takes a closer look at how the impact of a service prototype on the service experience can be measured. This study shows what a process for generating a questionnaire can look like and what the benefits of the approach are. The service is healthcare that is provided from an emergency ward. The prototype is located in the waiting room where people register, pay, and wait to get treatment. The question is whether the experience of visiting the waiting room can be manipulated in line with the intentions of the designers that design the prototype, and if the designers themselves can be made more aware of their own assumptions about what they can affect.

Each of the studies will also address a specific research question, or part of a research question. The individual questions and corresponding chapters is outlined below. The following sections will explain the methods used in each study in more detail.

### **3.1 Existing conceptualisations of prototyping and prototypes**

This study will answer the research question: what does design research say about prototyping and prototypes? The study is presented in chapter 4.

### **3.2 Service prototyping according to service design practitioners**

This study will answer the question: what is service prototyping according to practitioners? The study will examine definitions, purposes, challenges, and approaches reported by service design practitioners. The study can be found in chapter 5.

### **3.3 Inclusion in service prototyping**

This study will contribute to the previous study and the question of what service prototyping is. It will focus on the issue of inclusion and co-creation and how that is done by practicing service designers. The study is presented in chapter 6.

### **3.4 Communicating service experiences during design meetings**

This study looks at how previous service experiences are used in design communication and will answer the question: how are prototypical experiences incorporated in design communication? The study is presented in chapter 7.

### **3.5 Developing a tool for measuring service prototype experiences**

The last study answers the question: how can service prototypes be evaluated? The study is located in chapter 8. The last research question is: how can research improve service prototyping? This question will be addressed in the discussion, chapter 9, where the

question of how existing knowledge about prototyping can support prototyping in service design is also considered.

### 3.1 Literature study

Study 3 is the result of a literature study aimed at forming a basis for further research on prototyping services. The study took a paper by the organizing committee of the Working Conference on Prototyping, in the early 1980s (Floyd, 1984) as starting point. By following references to and from that paper, a total of 30 research papers were read that was considered relevant in the pursuit of identifying a framework of prototyping perspectives. Most papers were published in information systems and related fields. The central themes that concern the practice of prototyping and are repeated in design literature are the basis for the framework. The perspectives will not be presented in any specific order and the resulting framework will be compared to existing frameworks such as Houde & Hill's (1997), based on what prototypes prototype, and Lim & Stolterman's (2008) framework outlining the anatomy of prototypes. The framework can be used as a basis for continued research and development of prototyping, as it summarizes some of the more prevalent perspectives.

### 3.2 Interviews

The interview studies (2 and 3) reveal what service prototyping is according to service designers and how service designers say they involve all the different stakeholders that effect, and are affected by, the service experience. The studies used an interview approach where practicing service designers were contacted during the fall of 2009 and winter 2009/2010. At this point there were not many consultancies that claimed to work with service design so the process of choosing participants for the study was framed by this situation. The studies are based on 6 interviews. 4 of those had been contacted and interviewed in an earlier project (see Segelström, 2009; Segelström & Holmlid, 2009). In total 7 interviews were carried out with design practitioners. The first interview was a pilot that lead to changes in the interview questions and was thus excluded from the final data set. Design agencies that say they work exclusively or mainly with service design were prioritised, though one of the respondents only partially worked with service design. Their backgrounds and level of experience within the field of service design varied. The backgrounds of the informants can be seen in Table 1, where some additional information can be found as well. The service designers were based in the Nordic countries (2), USA (2), and The Netherlands (2). The shortest interview was 35 minutes long, and the longest one took 105 minutes. The average interview was about 74 minutes long and all the interviews were conducted via telephone (2), or Skype (4).

The informants were not informed before the interviews that the topic would be prototyping and the interviews started with some more general questions about their backgrounds, typical processes and idea generation. After that 25 questions were used to

collect data in a semi-structured way. For informants that had not been interviewed before, 4 additional questions were asked. The interview guide can be found as Appendix C.

TABLE 1: REGIONS AND BACKGROUNDS OF THE INFORMANTS.

	Region of operation	Educational background	Professional background
1	Nordic	Industrial and Interaction design	Interaction and Service design
2	Nordic	Industrial design/ Art school	Design strategy
3	USA	Journalism	Interaction design/ Marketing
4	The Netherlands	Software engineering	Mobile marketing
5	The Netherlands	Photography/ Communication	Marketing/ Business strategy
6	USA	Interaction design/ Media	Web design/Art director

### 3.3 Analysing objectives, approaches, and techniques for inclusion

A framework for analysing how stakeholders were included in design projects, as described by the informants in Study 3, was used. To describe and understand the way that the informants in the research say they involve stakeholders, Holmlid (2009) and Sanders (2008; 2006) were used to provide a conceptualisation of inclusion in design. Holmlid (2009) suggested that what separates the different ways of including stakeholders in the design process are the *objectives*, *approaches* and *techniques* utilised by the designers.

#### 3.3.1 Objectives

The objectives of designers reside on a strategic level which influences all other decisions in projects. For instance, design agencies might consider democratic motivations and flat power hierarchies as their main motivator in co-creation. Holmlid (2009) calls such objectives emancipative. As it is in the participatory design literature, there are typical expressions of emancipative objectives in service design literature. “No, design is not serving people today. Design is serving markets, not people. Design is serving the needs of companies, not people. And as a result, consumerism is out of bounds.” (Sanders, 2006, p.28) Another example can be found in the working definition of co-design from DEMOS<sup>2</sup>; “[c]o-design shifts power to the process, creating a framework that defines and maintains the

<sup>2</sup> A British think tank working with inclusive methods to influence policy-making.

necessary balance of rights and freedoms between participants. There is equality of legitimacy and value in inputs from all those involved, whether suggestions entail large- or small-scale changes. This combination of controlled abrogation of power by those with whom it usually rests, and the concomitant empowerment of those in a traditional 'client' role, serves to create a sense of collective ownership." (Bradwell & Marr, 2008, p. 17)

This is also where Sanders' (2006) distinction between users as partners and users as subjects come in. This research does not view this as a dichotomy where stakeholders must be either or. Most of the time there are probably many different degrees of involvement and different ways of involvement within companies and within projects. Users (or customers) that are incorporated as long-lasting active co-creators in design are an expression of an emancipative view of partnership. If on the other hand the main assumption is that design is best done by designers, and users should be left with the role of reactive informants that is an expression of a certain strategic mind-set. These objectives also affect the approaches used on a tactical level.

### 3.3.2 Approaches

Cooperative and non-cooperative approaches can thus be the result of different objectives. The approaches reveal themselves in the activities carried out by design agencies on a tactical level. An expression of a cooperative approach can be look like this: future dementia care should include the experiences of people with dementia and their families by ensuring "... [they] are not just listened to, but are fully engaged with the design and delivery of services to secure improved outcomes." (Tan & Szebeko, 2009, p. 190)

Many different texts have been published displaying various kinds of cooperative approaches in service design projects. Most notably perhaps the two do/think tanks RED<sup>3</sup> and DEMOS, which have contributed to applied research of methods and strategies for participation (Vanstone & Winhall, 2006; Bradwell & Marr, 2008; Burns & Winhall, 2006; Burns et al, 2006; Parker & Heapy, 2006). Most examples like these, of high level cooperative approaches come from public sector or research projects. Another manifestation of the approaches is of course the techniques utilised by designers.

### 3.3.3 Techniques

When looking through the eyes of co-creation the different techniques of involvement used on an operative level is interesting. One such trend is design techniques with a number of different outputs, one being research related to the bigger trend of co-creation (Raijmakers et al., 2009; Kronqvist & Korhonen, 2008; Blomkvist & Holmlid, 2009; Miller & Hamilton, 2008; Keitsch, et al., 2010). Han (2010), in her dissertation, discussed why service design is

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<sup>3</sup> A "do tank" set up by the British design council that conducted projects between 2004 and 2006 using design as driver for innovation.

suitable for collaborative approaches and the extent to which users are involved in service design projects. “The user-centred nature of service systems provided a suitable environment for designers to experiment with tools and techniques generated in areas such as Experience Design, Emotional Design, and Design Ethnography with service users in a real world context. Traditional design techniques such as visual narratives, story-telling and modelling, together with new methods such as role-playing and body-storming, become important means to help both users and the design team to easily engage with each other in generating and testing ideas for future scenarios” (Han, 2010, p. 38).

This study (3) will reveal what techniques service designers say they use in the later stages of the design process. This will allow us to make an assessment of the ability to include people in service prototyping.

### 3.4 Communication analysis

A closer look at how service experiences are used in design communication (Study 4) should contribute knowledge about the structure of such contributions and what role the experience of services plays in design teams. To understand communication in design one can find support in Clark’s notion of *common ground* (Clark, 1996). In Clark’s vocabulary, design is a joint activity and as such it is inseparable from communication. Like all joint activities, design is goal oriented which means that the participants are trying to achieve both private and public goals on different levels. To do so, the design team must coordinate their activities and the accumulated knowledge that they have in common. In each given moment the participants in a joint activity brings previous information that partly converge with the information of other participants, e.g. information about previous experiences. This shared information consists of mutual knowledge, beliefs, and assumptions, and those are the constituent parts of common ground (Clark & Brennan, 1995).

The initial common ground in a design project is the collective understanding of the information the participants share, and as the project progress they accumulate more and more *public events* that are separately remembered as *annotated records* and more abstract *outline records* by the participants. *External representations* such as the design documentation or prototypes are also useful to understand the current state of a shared activity. To collaborate effectively in a design process, participants need to be able to make references to prototypes and other items (e.g. boundary objects). So, common ground allows participants of a joint activity to coordinate their actions based on their shared information about various representations and other events. This also means that what is not part of common ground, cannot be used to coordinate joint activities. Such representations must first be *grounded* (Clark & Brennan, 1995) to be accessible.

Grounding refers to the process of adding information to common ground. During collaboration and communication people use different grounding strategies depending on

the purpose, which is usually established collectively. If the purpose is to design something, grounding will happen in a special way that serves that purpose. To analyse actual communication between members of a design team, this framework can be used to understand better what is going on in the collected data. First, one must then transcribe the material to make it more available to analysis. Transcription is the transfer of speech into writing to study the structure, form and content of communication. The transcripts and notations were made in line with guidelines suggested by Linell (1994), which divides transcriptions into three levels depending on how the text should be analysed. The third, and least detailed level, has been applied in this paper which means that syntax and punctuation are used in line with regular writing conventions and things like mistakes, hesitations, repetitions, and so on are ignored. This level serves the purpose of revealing and analysing cognitive content (Linell, 1994).

When the material is transcribed it will be easier to find trends and recurring patterns of communication in the material. The different communicative techniques employed by the participants, such as argumentations, behaviours, and terminology, become clearer and as the analysis continues it is possible to say something about how different situations are handled in the studied activity.

With the overarching goal of identifying origin, structure and purpose for incorporating previous service experiences in design communication we looked at the communication in two service design projects. Observations and audio recordings from projects at the Swedish Customs and the National Meteorological Institution (SMHI) were analysed. Communication within the design teams was analysed using theories from communication analysis. A total of 454 minutes of audio recordings, collected during 4 separate design meetings, was the core data source. A total of fourteen people, ranging from company staff to trained designers and developers, participated on different occasions. The meetings were held via conference calls and/or video conference calls, which made visual communication difficult or impossible. We did not take part in any way during the meetings but the participants were aware that we recorded their sessions.

### **3.4.1 Service concept**

Study 4 will also use the theoretical foundation of service concepts to analyse and describe what goes on in the transcribed material. A service concept is an abstract construct, a shared understanding of the service that is being designed. A service concept has been described as: “the general description of the offering and the elements which communicate the service itself (service brand, identity and mood); these elements are translated in the particular aesthetic of the interaction stream (service encounters) and in the peculiar characteristics of the service evidences, like tools, environments, etc. or in the proprietary script of the interaction/dialogue with the service operators.” (Maffei et al., 2005; p. 7)

Exemplars provide information about other services' interaction streams and characteristics that makes it easier to align the service with customer needs and expectations. As a tool in the design of services, it has been suggested that the service concept can 1) be the link between business strategy and service design and 2) that it can be used to measure the financial performance of a service (in Goldstein et al., 2002). Agreeing on a service concept is an important part of service design which allows the business strategy of an organisation to be aligned with the needs of customers.

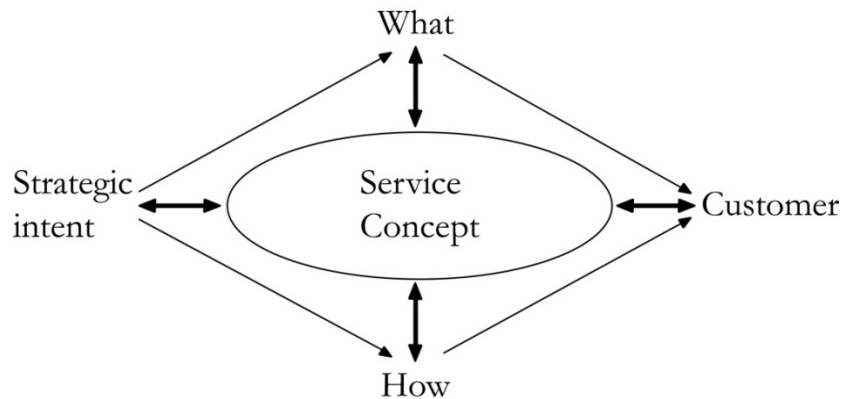


FIGURE 3: THE SERVICE CONCEPT (ADAPTED FROM GOLDSTEIN ET AL., 2002)

An analytical model of the service concept, seen in Figure 3, has four dimensions – *how*, *what*, *strategic intent* and *customer*. The concept is represented in the minds of designers and managers, but also the customers have certain expectations and needs associated with their understanding of the service. The *what* of the service concept roughly relates to the impression of a service as a whole, while the *how* is related to the way the service is delivered. In this study we will also look at the service concept as a way of explaining what goes on in discourse during actual, situated design practice.

### 3.5 Case study

The last study (5) reports from a case that should provide insights about how to measure the impact of service prototypes. A process for developing a tool that can be used by design practitioners to evaluate the successfulness of their service prototype, in a specific service category is suggested. This study is based on a project where a service design agency in Sweden worked with a big hospital to improve (in ways that will be specified later on), the emergency ward waiting room. Our role as researchers in this project was as a third party – we did not take part in the design activities. The hospital had already been planning to make changes to the existing waiting room at the emergency ward for adults. Hence it was agreed that in the first phase, the design agency would do a short research study leading up to a number of recommendations for the emergency ward. After this phase there were some negotiations with the hospital and the second part of the project, which was supposed to be a prototyping phase, was delayed. This meant that when the project got started again, too



much time had passed and the designers needed to do another, short research effort. This led to some re-evaluations of previous decisions and highlighting of other problems and solutions. The progression of the project was followed by continuous updates in the shape of design documentation, notes from meetings, and email conversations. In total, 3 interviews with 2 different designers were conducted. 1 interview was conducted after the first research phase. A presentation the designers had held for the hospital was sent to us after the interview. The same designer was then interviewed after the next research phase when also another designer was interviewed. The interviews only had one purpose; revealing the designers' assumptions about the prototype, problems and solutions. The format of the interviews were thus open but started with questions about problems, what they wanted to do (i.e. to prototype), and finally what parts of the prototype that would achieve their goals.

### 3.5.1 Categorising the service

Study 5 was more “applied” than the other studies, and concerned a specific type of service. To be explicit about what service was intended, and in what kind of service context it can be used, we used existing categories suggested in the literature and tried to build up a new categorisation hierarchy to support our understanding of the service. The first question was adapted from Kimbell (2009) and concerned *where the service takes place*. The answer to this can be either that the service is *location oriented* or *location independent*.

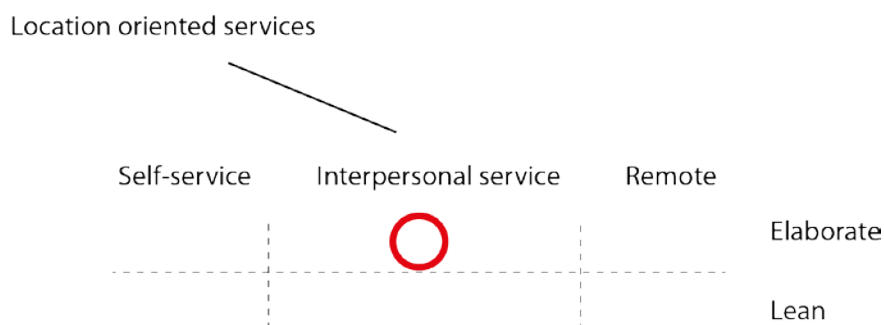


FIGURE 4: THE SERVICE CATEGORY RELEVANT FOR THIS STUDY IS MARKED BY A CIRCLE.

The second question depends on the answer to this question, but for location oriented services – which poses specific challenges for service designers – the framework of Bitner (1992), explaining the factors that affect the service experience in a servicescape was used. This meant that the next step was to decide whether the service was a *self-service*, *interpersonal*, or *remote service*. This depends on who performs actions in the servicescape (customers or employees) and what the important stakeholders are. In self-service domains like movie theatres, amusement parks, and ATM's, the customer mainly performs actions. Service domains like hotels, hair salons, and hospitals are interpersonal, in the sense that both customers and employees perform actions. In remote services the employees perform actions. This can be domains like insurance companies, utility, and professional services.

In addition, depending on how complex the service is, it can be categorised as *elaborate* or *lean*. This will also have an impact on design decisions and scope of the design project. For location independent services we probably need to pose other questions, but so far research about what they are is missing. Based on the suggested classification, Figure 4 shows the kind of service this case concerned.

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## **4 Study 1 – Existing conceptualisations of prototyping and prototypes**

This chapter is based on the paper Existing prototyping framework: considerations for service design, accepted to Nordic Design Research Conference, NorDes 2011 (Blomkvist & Holmlid, 2011).

### **4.1 Introduction**

With new design disciplines that challenge the borders of design practice and inquiry comes new possibilities for prototyping techniques and approaches. The basis for such an evolution is a firm understanding of the existing knowledge generated in design and the challenges posed by new design disciplines, such as service design. This study identifies a framework of perspectives for prototyping to reveal what the existing toolbox of prototyping contains based on a literature overview. The study builds up a framework based on a literature study of 30 sources, mainly from the field of information- and interaction design. More on the method used in this study can be found in the Method chapter (3.1). The framework is constructed using the following perspectives; purpose, fidelity, audience, position in the process, technique, and representation. These perspectives make knowledge about prototyping explicit and summarise contemporary approaches.

### **4.2 Theoretical framework**

A large body of knowledge concerning prototyping in design has been developed over the years. Research has been published in a number of different fields, highlighting various perspectives and frameworks. The research presented here takes a paper from the organizing committee of the Working Conference on Prototyping, in the early 1980s (Floyd,

1984), as a starting point for a literature study. The aim of the study is to identify a framework of perspectives for prototyping and to see what the existing toolbox of prototyping contains.

An overall trend in contemporary design is that increased focus is put on experiences, contexts, and social interactions (see chapter 2.1). In parallel, design disciplines and the associated tools and methods, are constantly changing and evolving. In service design, for instance, the scope of design is changing; both by involving more stakeholders in the design process, and by an increasing complexity due to the intangible design material, multiple interaction channels, and so on. This means that prototyping challenges arise that need to be met by the existing tools and design methods, or perhaps that new approaches emerge, or need to be developed. The study is intended to make assumptions explicit about the benefits and boundaries of prototyping, by highlighting existing concepts and perspectives. The 30 sources were selected mainly from Information Systems, Interaction Design and related fields, and were used to generate the framework of different perspectives on prototyping. The resulting framework will be presented alongside a description of prototyping, to uncover strengths and weaknesses when adopting or transferring existing approaches, techniques and perspectives to other or emerging disciplines.

#### 4.2.1 Prototyping Vocabulary

When trying to make knowledge explicit, the conceptualisation and terminology is important. Definitions of “prototype” and “prototyping” vary of course, not the least since it means different things in different design domains such as architecture, graphic design and fashion (Beaudouin-Lafon & Mackay, 2007). Some consensus can however be identified in a number of central constituents that recur in the literature. Most definitions, be they formal or informal, mention prototypes as representations, embodiments or manifestations. What they represent is commonly said to be ideas, described as hypotheses or assumptions about the future. A third element of most definitions is that it must be possible to test the ideas that the prototype represent, i.e. to evaluate the degree to which the prototype succeeds to meet specified criteria.

Based on the literature it was clear that many times the act of prototyping and the actual prototypes are not explicitly separated, leaving some confusion about what the papers actually address. Prototyping should be viewed as an activity or a mind-set utilized by designers. One way to define prototyping is to simply refer to a discrete part of the design process, (see e.g. Floyd, 1984), commonly called prototyping, conceptualisation or ideation. Prototypes on the other hand are the representations of ideas and the artefacts that designers use when prototyping. Some attempts have been made also to clarify the relation to other tools in the design process, such as (Holmquist, 2005) who claim that *Prototypes* have the functionality but not the appearance of the finished product. *Mock-ups*, on the other hand, have appearance but not functionality, while *representations* include both kinds

(ibid.). No distinction between mock-ups and prototypes will be made in this study, but all prototypes are considered representations (or e.g. manifestations). As representations they are also considered as specific types of visualisations with a certain purposes. A distinction will be made between prototypes and the activity of prototyping.

### 4.3 Prototype perspectives

When it comes to prototypes, one of the most rigorous classifications has been made by Lim et al. (2008) using the metaphor of *filters* as one dimension and *manifestations of design ideas* as the other dimension of what they call the anatomy of prototypes. Figure 5 is a visualisation of the components and the relations in the anatomy suggested by (Lim et al., 2008). In their conception of prototypes, parts of the whole idea are filtered through to allow different aspects of the design to manifest in the tangible prototype. Doing so allows for the different aspects to be explored or tested. This conception is a helpful expression of what makes prototypes important in design. It illustrates how, when you start building, the idea is refined, corrected and developed (or refused), based on how the manifestation talks back (Schön, 1983) at different levels. There are however different types of prototypes and varying purposes that accompany the different prototypes.

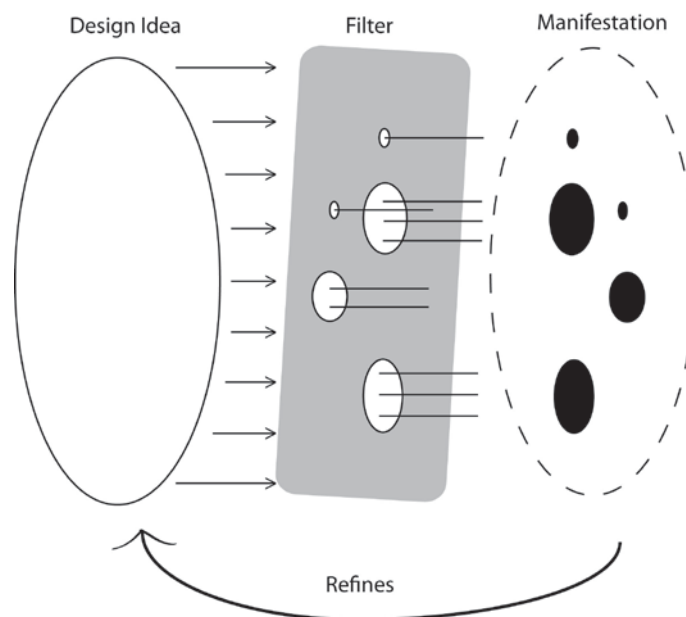


FIGURE 5: PROTOTYPE DIMENSIONS IN RELATION TO DESIGN IDEA (INTERPRETED FROM LIM ET AL., 2008)

A categorisation of prototype perspectives in interactive systems can be found in Beaudouin-Lafon & Mackay (2007). Their proposed dimensions of prototypes were;

- *representation*, describing what kind of prototype and what form
- *precision*, referring to the level of detail in the prototype's representation
- *interactivity*, describing the level of interactivity available to users, and

- *evolution*, that looks at the whole expected life cycle of the prototype.

Another way of classifying prototypes is to divide them according to what they, in their role as prototypes, represent (i.e. what prototypes prototype). Houde & Hill (1997) suggests that designers mainly use prototypes to address one of the three dimensions; *look and feel*, *role*, or *implementation*. *Integrated* prototypes can also be utilized to explore a balance of aspects between all three dimensions. In the framework suggested by Lim et al. the look and feel dimension would be ordered under manifestations, while the two other dimensions – role and implementation – would correspond to filter properties.

#### 4.4 Prototyping framework

The constituents of the framework are the result of the literature study and the central themes that concern prototypes and the practice of prototyping that are repeated there. The framework will function as a context for the following sections where service attributes and service prototyping challenges are contrasted with the framework, followed by a discussion pointing to some interesting future areas of inquiry.

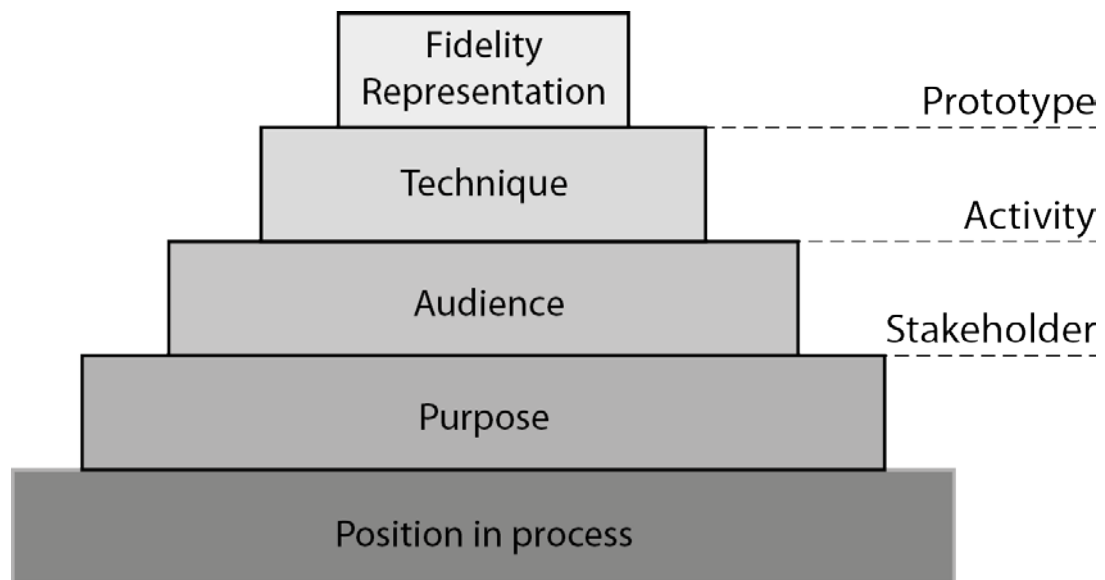


FIGURE 6: THE FRAMEWORK OF PERSPECTIVES ON PROTOTYPING AND PROTOTYPES.

The perspectives are not mutually exclusive. Rather, they are interdependent and of different levels of importance to different practices of design. In practice, there are always constraints of different kinds such as budget, scope, and time, which influence the practical possibilities of prototyping and prototypes. The perspectives in the framework are; purpose, fidelity, audience, position in process, technique, representation. A representation of the framework can be seen in Figure 6.

The smallest piece of the pyramid, at the top of the framework visualisation represents the prototype. It is governed by representation – what it actually looks like, what information it



contains, what it weights, it's colour, what it is made of in terms of material and other perceivable aspects, and what roles are represented in it. All these aspects can also be represented in various levels of fidelity. Below the prototype level is the activity level, representing how the prototype is used and what prototyping technique is used. This level, in turn, is built on the stakeholder level, representing the different viewpoints that an audience can have. The audience of the prototype needs to understand the technique and the representation, thus influencing both the activity and prototype level. The audience will also change with both time and purpose. The purpose will be different depending on where in the process the prototyping activities take place. The purpose for prototyping will affect which stakeholders to involve, what prototyping activities to conduct and how the prototype is represented. The parts of the framework will be introduced from the bottom up, and discussed more extensively in the following sections.

#### **4.4.1 Position in Process**

As stated earlier, prototyping is sometimes defined as the activities performed during a specific part of the design process (Floyd, 1984). In that sense, prototyping can be seen as an approach or mind-set rather than a set of tools or activities. It can also be interpreted as an event that happens at a particular time in the process, following a research phase and possibly a phase of idea generation, and preceding the implementation phase.

Most methods developed to represent and visualize in design can be used for prototyping. Sketching is one such method that in many ways resembles prototyping. What separates them can roughly be said to be the position in the process (Buxton, 2007). Early on, sketching is a quick and inexpensive way to represent ideas and test them, but as projects go on, sketches are replaced by prototypes that are more detailed and elaborate. Some consider only very high fidelity prototypes as actual prototypes, while others conceive of prototypes more as “learning tools” that may exist on any level of resolution (Coughlan et al., 2007).

There seems to be a connection between purpose and position in process in that early on, prototypes are used more to explore and evaluate, and later on to communicate ideas to an audience (Voss & Zomerdijk, 2007, see also 4.4.2). Rapid prototyping is part of IDEOs design philosophy and culture, which means that prototyping is part of the process from the beginning of projects (Thomke & Nimgade, 2000). This means that early on, prototypes must be really quick and rough, not to slow down the momentum of projects. The rapid prototyping approach is now widespread and sometimes means that prototyping is an on-going activity throughout the design process. The character of the prototypes in such projects changes with time and generally become more and more high-definition prototypes. There is research which suggests that single prototype approaches, such as traditional rapid prototyping, is inferior to using many parallel prototypes simultaneously, and that the result is rated higher and as more divergent (Dow et al., 2009).

#### 4.4.2 Purpose

The second perspective from which prototyping has been discussed is perhaps the most important to consider; purpose. The purpose of prototyping is a perspective dealing with the reason for prototyping and what aspects to represent. When Houde & Hill argued that designers need to be aware during every step of the prototyping process of what they are actually prototyping (Houde & Hill, 1997), they were addressing the issue of purpose in prototyping. Considering this perspective in prototyping is commonly overlooked according to Schneider (1996). The purpose should nevertheless be a highly prioritized perspective, since it inevitably dictates the terms of how prototypes are constructed. The purpose also changes with design disciplines, i.e. motivations behind industrial design prototypes are presumably different from interaction design prototypes and it also changes depending on what the prototyping culture looks like (Schrage, 1996).

Depending on background and current occupation, different purposes of prototyping are held forward as more prominent than others in the literature. Three main themes have occurred more often than others; *exploring, evaluating, and communicating*, (see e.g. Buchenau & Fulton Suri, 2000; Schneider, 1996; Smith & Dunckley, 2002; Voss & Zomerdijs, 2007). When the purpose is to explore, ideas might only be hunches or intuitions that the designer wants to try out. Explorative prototypes are especially used in early stages and well-suited in rapid prototyping projects. If the purpose is to explore some aspects or ideas about concepts, prototyping must be adjusted to generate feedback, inspire, and reveal new information. Unlike explorative prototypes, evaluation prototypes are based on more elaborate design ideas, and generally envision a more explicit hypothesis, encompassed by assumptions about what it should achieve. This division is also relevant in relation to two other concepts that govern choices of purpose. Those are *process* prototypes, focusing on the development activity, such as generating ideas or knowledge, and *product* prototyping, which focus on the result of prototyping activities (Bäumer et al., 1996).

When prototypes mainly function as tools for communication, the purpose may be more tilted towards presentation and persuasion than evaluating or learning. The design idea is manifested, in this kind of prototype, to suggest new directions of projects, to make sure that all the stakeholders are talking about the same thing, or simply to receive input about improvements.

Returning once again to the framework of Houde & Hill (1997), it is important to be clear about the purpose of the prototype to make evaluation possible. If the prototype mainly explores the artefact's role in a context, then the successfulness of the prototype should be measured based on the perceived quality of the role dimension. These dimensions are only useful as long as the prototype can be divided sensibly into any of the three dimensions. The research of Houde & Hill considered in this thesis, has concerned how the prototype is used and what it tests. Focussing on evaluating certain aspects of a prototype by disregarding

some aspects that the designers are not interested in, or can't afford to prototype, allow them to evaluate only selected aspects of concept ideas.

### 4.4.3 Audience

Prototypes can be designed as tools for the purpose of communication, as we have seen. As such, they appear as part of a performance, and there are supposedly benefits from consciously orchestrating such performances to satisfy target audiences (Kelley, 2001; Arvola & Artman, 2007). In fact, not doing so might have a number of unwanted consequences (Bryan-Kinns & Hamilton, 2002).

It is recommended that the fidelity (see 4.4.5) should be at par with the audience's ability to interpret and understand the prototype – its' role and purpose - while at the same time elicit feedback at a meaningful level (Bryan-Kinns & Hamilton, 2002; Samalionis, 2009; Markensten, 2005). The most likely audiences can be categorized as *clients*, *users/customers*, and *colleagues*. Each one can be broken down into smaller categories; colleagues for instance might be divided into designers with a variety of backgrounds, business strategists, brand consultants, usability experts, project- and business managers, and so on. When the audience is a client, the main aim is typically to sell an idea, support the client in an acquisition process, or convince the client to proceed with a project. Users and customers are usually involved to evaluate and test the prototypes, perhaps as part of the data collection before introducing changes and ideas to clients.

Understanding who the audience is also helps understand the prototype itself and even when the audience is made up of other designers, designers that work together every day, differences of background, culture, or language might force them to consider how and what to communicate (Erickson, 1995; Blomkvist & Holmlid, 2009). Kelley (2001) provides a number of examples of how prototypes have helped improve communication with clients, and says that they do so by taking on the role of “a spokesperson for a particular point of view” (ibid., p. 39). This enables all stakeholders to understand, and question, that viewpoint.

Schrage (1996) has argued that there is something fundamentally wrong with how requirements are generated and communicated in the average software project. To be successful in client interactions and prototyping Schrage (1996) suggested the Prototyping Partnership Principle that 1) more emphasis is put on what people do than what they say, 2) a prototype is always brought to client meetings, and 3) prototyping is done with, not for, clients.

In the participatory design approach (Ehn & Kyng, 1991) as well as in work on usability procurement, see e.g. (Markensten, 2005) prototyping with clients and users is an assumed practice. Given that prototyping is a social situation, the kind of feedback given in a prototyping process will inherently be influenced by the relationship between the designer

and the audience. What this relationship looks like in service design is analysed further in Study 3, chapter 6.

#### 4.4.4 Technique

Another perspective in the framework is technique, many times also referred to as tool or method. Technique should be chosen with the other perspectives in mind; the purpose justifies the method, just as the required fidelity, the target audience, and position in process dictates what technique or tool should be used. It is ultimately up to the designers to choose what method to use, and the experience and skill of the designers will to a large extent affect the successfulness of the method.

Techniques and tools encompass methodical frameworks (Buchenau & Fulton Suri, 2000; Mehlenbacher, 1993; Sato & Salvador, 1999). A suggested classification of techniques in software development (Floyd, 1984), outlines design approaches relevant for prototyping; *modular design*, *dialogue design*, and *simulation*. The tools for prototyping in early software prototyping were mainly purpose-general, but the need for new purpose-specific tools has been made evident (Floyd, 1984). The development of tools, techniques and methods go hand-in-hand and follow the advances of design at large. Popular methods and techniques in interface design are e.g. sketches, mock-ups, paper prototypes, video prototypes, wizard of Oz and scenarios. The techniques used by service designers to prototype are listed in chapter 6 (6.5.5).

#### 4.4.5 Fidelity

Fidelity is what Beaudouin-Lafon & Mackay (2007) called precision. Fidelity is the level of refinement, resolution or degree of detail displayed by a prototype. This level is a way to assess how closely the prototype resembles a finished product, (artefact or service) and how much of the information or interactivity it portrays. Parts that are low-fidelity are usually thought of as more open for discussion while high-fidelity is said to communicate that the element is already finished and decided, and thus not open for discussion. Low- and high-fidelity is sometimes seen as the most general way to distinguish between prototypes (Rudd et al., 1996), and attempts to expand the fidelity concept to include all possible kinds of prototypes have been made (McCurdy et al., 2006).

Some research, however, has shown that simply dividing prototypes into low- versus high-fidelity can be problematic (Lim et al., 2008; McCurdy et al., 2006). The problem with only high- and low-fidelity is that the same prototype may be both high and low level at the same time - in diverse (or the same) aspects. For instance, a prototype may be partly crude and rudimentary when it comes to interactivity, and partly refined to direct certain kinds of feedback to the different parts of the design (Wong, 1992).

Prototypes can also be of different fidelity in regard to different aspects, such as graphics, weight, content and so on. This prompted McCurdy et al. (2006) to suggest that “it is useful to conceive of prototypes along five orthogonal axes:

- level of visual refinement,
- depth of functionality,
- breadth of functionality,
- level of interactivity, and
- depth of data model.” (p. 1240)

This allows for a more nuanced way for designers to talk about and structure their prototypes, enabling them to predict more precisely how to evaluate and what kind of feedback they will generate. Notice that what Beaudouin-Lafon & Mackay (2007) calls the interactivity dimension in prototyping is included in this list. Different levels of interactivity can be said to be aspects of the fidelity of prototypes just as well as surface properties or amount of data represented. Beaudouin-Lafon & Mackay’s concept of interactivity corresponds roughly to the feel (in Houde & Hill, 1997) of the system in this framework – what it feels like to use an artefact.

There seems to be somewhat of a consensus that resolution decides what kind of feedback you will get (Buxton, 2007; Wong, 1992), though the preferred level of detail is not necessarily agreed upon. For instance, Buxton (2007) promotes low-tech (and low-fidelity) prototypes, while Holmquist (2005) suggests that to generate reliable information the representation must give a realistic impression. Bryan-Kinns & Hamiltons work (2002) also suggest that the match of fidelity of different aspects, such as graphic and interaction, is important and might benefit from some level of coherence.

Finally, to investigate how a new element relates to the larger context, or explore the context of use, *horizontal* prototype types can be constructed. The types that explore more deeply, selected elements of a prototype, or specific functionality, are called *vertical* prototypes (Floyd, 1984). Beaudouin-Lafon & Mackay (2007) also distinguish between horizontal, vertical, task-oriented and scenario-based prototypes under the prototyping strategies rubric. Horizontal and vertical prototypes are different types of prototypes in this framework, while task-oriented and scenario-based are prototyping approaches (that utilise prototypes), referring to the activity of prototyping as opposed to prototypes in themselves.

#### **4.4.6 Representation**

Finally, prototypes can be thought of from the perspective of how they are represented, what they actually look like and how they are materialised. Even complete artefacts that enable prototyping to be carried out are part of the representation perspective, as well as locations or situations. Representation is part of many conceptualisations of prototyping. In Lim et al. (2008) representation is roughly the same as material, which is seen as one of the

manifestation dimensions. The material aspect is of the representation perspective in this framework since it also incorporates the notion suggested by Beaudouin-Lafon & Mackay (2007), of representation as the form of the prototype, i.e. what constitutes the actual prototype.

Choices of how prototypes are manifested are in many ways based on economical judgments. Early in projects it is wise to choose cheap or already existing materials, that are easy to work with and adjustable. Cheaper materials allow for more testing, which in turn let designers try out more assumptions about design ideas. As the project progresses and the ideas become more precise, more expensive materials can be chosen that more precisely convey the intended impression of the prototype. This perspective might be especially interesting from the perspective of design disciplines such as architecture, product design and graphic design (Beaudouin-Lafon & Mackay, 2007).

### **4.5 Discussion**

This study has answered the research question: What does design research say about prototyping and prototypes? The answer has been presented as a framework of perspectives on prototyping; purpose, fidelity, audience, position in the process, technique, and representation. The framework makes existing knowledge and perspectives explicit. Dividing the perspectives into stakeholder, activity, and prototype and visualising them as increasingly higher up in a pyramid, suggests a way to approach prototyping. It can be seen as one way of setting up a prototyping process from the bottom up, starting with the purpose and thinking about which audience will be addressed. This in turn will influence decisions about what technique to use, and thus how to represent the actual idea and at what fidelity.

The position in the process is slightly different from the other perspectives, since it doesn't directly relate to human choices or activities, but rather at what time the prototyping occurs. It can be argued that the purpose and position in process should be at the same level of the framework, since choices affect when prototyping occurs. It can however also be said that position in process represents how much of the possible solution is known at a specific time, and thus be a position in the amount of knowledge in the process. This is difficult to know before the project starts, and before prototyping commences. This means that the position in the process will affect the other choices that are made in regard to prototyping.

These perspectives can be used also in design education to highlight different aspects of prototypes and prototyping. This is then a way for students to conceptualise and structure their knowledge and it offers a way to problematize the different areas. Different strategic design decisions can also be based on deliberations of the various aspects of the framework and in reference to certain levels of the pyramid. For researchers, the framework makes knowledge available and areas where the framework should be supported and

complemented can be identified, thus supporting future research endeavours. The study will be concluded in the Discussion, in chapter 9.1, where implications for service design and prototyping in particular, and suggestions for new directions of prototype research will be added. The new suggestions will be made in line with the progression of prototyping practices and new contexts brought by design disciplines such as service design. The assumption is that service prototyping can be based on earlier approaches and knowledge generated in other fields but needs to be redefined and complemented to suit service prototyping as a practice in its own right. Conclusions and additional thoughts about the framework can also be found in chapter 9 (9.1.3).

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## **5 Study 2 – Service prototyping according to service design practitioners**

This chapter is based on the paper Service prototyping according to service design practitioners (Blomkvist & Holmlid, 2010). The paper was peer reviewed and accepted to the Nordic Conference on Service Design and Service Innovation, ServDes.2010.

### **5.1 Introduction**

Current trends in service design research include case studies and similar approaches that aspire to reveal what the practice of service design looks like. The understanding of how service design is performed can serve as a base for future research into more specific research endeavours. One area where knowledge is said to be lacking is service prototyping. This study attempts to contribute knowledge about that area. The main data source for the study is findings from in-depth interviews with six practicing service designers from some of the more well-known service design agencies. We expected to find evidence of holistic collaborative approaches to prototyping services.

### **5.2 Interviews**

This study reports mainly on answers to the question “Can you talk a little about how you actually make prototypes?” but also includes other answers relevant to that question. None of the designers knew beforehand that the interview was going to be about prototyping. A table (Table 2) show some basic information about the informants and what geographical region they are active in. More information about how this study was conducted can be found in the Method chapter (3.2). The information in the table has been retrieved from the interview material and the answers provided there. Mainly the questions about their

background, prototyping practice and who they involve in the creation of prototypes have been used.

TABLE 2: THE INFORMANTS AND SOME CHARACTERISTICS OF EACH PROTOTYPING APPROACH

#	Region	Author	Scope	Background	
	of operation	of prototypes	of prototypes	Educational	Professional
1	Nordic	Themselves	Holistic	Industrial and Interaction design	Interaction and Service design
2	Nordic	Themselves	Single touchpoint/s	Industrial design/ Art school	Design strategy
3	USA	All stakeholders	Single touchpoint/s	Journalism	Interaction design/ Marketing
4	The Netherlands	Themselves/ stakeholders	Single touchpoint/s	Software engineering	Mobile marketing
5	The Netherlands	Specialists	Single touchpoint/s	Photography/ Communication	Marketing/ Business strategy
6	USA	In-house experts	Single touchpoint/s	Interaction design/ Media	Web design/ Art director

### 5.3 Results

In the following sections, the main themes of the reported practice of service prototyping will be presented, starting with the main purposes for prototyping services. How and why prototyping is seen as an essential part of service design, and then some characteristics of current service prototyping will be described, followed by a presentation of the challenges for service prototyping according to the informants. The symbol “#” followed by a number is used to denote the different informants according to Table 2.

#### 5.3.1 Purposes for prototyping services

Service prototyping is primarily said to be used as a tool for *learning* or as a tool for *communicating*. All of the informants report using prototypes for both purposes, generally with the emphasis on one or the other. Service prototypes are communicative tools in the collaboration with stakeholders and colleagues; “[service prototyping] is a way to show a service without creating the service, to show what it could look like and how it could work”

#2. The visualisation of services is an important part of communicating with prototypes “[a] service prototype is an attempt at visualising for someone, whether it is a client or the end user, what the service would be like in the future, when wholly realised” #3.

The learning purpose can be divided into *exploring* and *evaluating*. These purposes are mentioned in different variations by most of the interviewed designers. Exploring is mentioned in terms of “generate insights, developing your thinking [about a situation] and gathering insights”, while evaluating is described as “testing, receiving feedback and finding fail-points”. Service prototypes are described as “a lightweight version of the actual service where the crucial parts of the service are tested” #1, “a situation from which you learn how to improve a service” #4, and “a way to develop your own thinking and receive feedback about that thinking from others” #6. Service prototypes not only help designers explain services to others, but also make them more feasible to themselves, it lets them “get a glimpse of the future” #3.

### 5.3.2 Prototyping as an essential part of service design

The informants were all asked whether they considered prototyping to be an important part of their work. Without exception, the answer was yes. Looking at their description of what their work processes looks like though, only half of them spontaneously mentioned prototyping. Looking at a larger data-set, including other interviews with service designers (see Segelström 2009, for a description of the interviews) prototyping seem to be a priority in the work process for about half (8/15) of the informants. This means that when half of the service design practitioners were asked about their general work process, they did not mention prototyping (or activities closely related to prototyping). There was also a big difference in how the informants approach prototyping. One design agency stands out in particular. #1 was the only informant to report that prototyping is done in a systematic way, regardless of the specific project they are working on. They were also unique in that they always make holistic prototypes, which means that they prototype a select number of touchpoints and test them to evaluate their prototypes, i.e. they prototype several touchpoints at the same time, instead of single artefacts or interactions, see Table 1. This allows them to take the whole service into account when prototyping.

The interview data also show that some of the agencies do not have a specific phase dedicated to prototyping. Two out of the six informants reported to have a prescribed way of working with prototyping. The process of collecting data and sorting the material seemed to be generally more well-defined and were accounted for in greater detail than prototyping. Excerpts from some of the interviews illustrate that prototyping is not a very articulated; “what is a service prototype? I don’t use that word” #2, or distinct practice within some of the agencies; “[t]he prototyping starts when we talk about ideas ./ If I have an idea and I talk about it with my client or with anyone- like a colleague -then the idea comes a little bit to life and ./ that is a way of testing the ideas” #5 and “[f]or me a prototype can be anything –

anything that helps you learn about the thing you want to test ./ Prototypes for us are anything that can be used to test a certain part of a new concept” #4.

As expected from reports on service design practice (see e.g. Vanstone & Winhall, 2006; Fullerton, 2009), the prototyping approaches were collaborative. A prerequisite for prototypes to serve as facilitators of communication is, like prototypes in general, their function as manifestations of ideas and thoughts (Lim, et al. 2008). This allows designers and stakeholders to communicate more effectively and collaborate around otherwise abstract concepts (Samalionis, 2009). This function was evident also in the interviews that support the image of service design as collaborative; “./ we work really closely with our clients and try to involve them in some way or another. It’s not like they give us an assignment and then we return to [our office] and then work for six weeks ./ and then return to uncover the finished product” #2. Working intimately with clients and involving decision-makers were seen as especially rewarding. In most cases though, the prototypes are produced (authored) by the design agencies themselves, see Table 1. When it comes to the evaluation of prototypes, all informants say they involve the stakeholders as much as possible.

### 5.3.3 Challenges for service prototyping

The result that service designers use prototypes to learn and communicate is perhaps not so surprising; variations of those purposes can be found in most design research papers about prototyping. More interesting are the specific challenges that the informants see with prototyping services.

The general attitude towards prototyping services seemed to be that it is helpful and that the benefit is greater than the cost. When asked whether the designers, in an average project, spend enough, too much or too little time on prototyping, two of the informants said that they want to do more prototyping. The interesting question is perhaps not if they do enough, but rather if they do enough for the client. #1 said they do enough for their clients, but that they had a feeling that the community as a whole does not. The reason why some informants do not do more prototyping is because the clients either do not see the benefit (#5) or the designers cannot motivate the extra time for more iterations (#4). Another aspect of the client relationship is reported by #3, who says that during prototyping it is important to “slow the client down” because at that point clients often want everything to happen at once. #2 believe they are doing just enough prototyping but would like to learn more about how to actually prototype for services.

The awareness that service prototypes are different than prototypes using other design materials was high, though the interpretations of the implications and concerns related to this difference varied a lot. For instance, several different aspects that make service prototyping more challenging was suggested, such as the *inconsistent* nature of services; “If

it's a technology-based prototype its presentation is the same each time, if it's a human-delivered prototype ./ it's going to be delivered a little bit different each time, even within the same person, or from person to person." #3. The problem of *authenticity* was also stressed (e.g. by #3) and this was reflected in some of the answers; "if you do role-play, you know the people who are taking part- they are role-playing. It's not the actual situation. They respond to each other because they pretend" #5.

The *validity* of the test situation in relation to the intended implementation context was mentioned several times by the informants. Simulations are not real situations, and therefore prototyping might not even be the best tool to use, according to #6. Testing concepts in isolation and then letting them out in "the real world", you never know what is going to happen #5. The complexity of services makes them more difficult to prototype and understand since it is hard to know what to look at #4, was another opinion. The validity of prototypes is a perspective on prototyping that has not been discussed in the literature, and this issue will be readdressed in the Discussion (9.1.1.1) of this thesis to complement the existing prototyping framework. An associated challenge was *time*, which largely affects the experience of service prototypes (#1 and #6). The problem of prototyping *intangible* things, such as experiences and social interactions was also prevalent in the interview material.

Another challenge is that many of the design agencies work with clients who do not necessarily know what service design is or that they are actually delivering a service, which means that the companies sometimes do traditional prototyping (e.g. mock-ups #2, animations #2, product models #6, and information #2). This can be frustrating, as illustrated by this excerpt where an informant talks about a project where they were hired to design the printed material for a public transportation service, but where they:

"[know] that public transportation is about much more – it's about what they tell you onboard the train or bus, what phone number to call for route information, how does the travel card work and how do you buy it online – all these things are parts of the service ./ But in this case the client could only handle one part of the service at once. In that case we did only one thing, but tried to push the client to see the whole picture." #1

## 5.4 Discussion

The research question that this study should answer was; what is service prototyping according to practitioners? In a sense, it is easier to describe what service prototyping is not. For instance, it is not *one* thing to the interviewed designers. What the research presented here can contribute is a number of characteristics of contemporary conceptions of what service prototyping is. Summarising the prominent features according to service design practitioners, indicates that service prototyping is an activity that is:

- 1) central to their work (but not a structured unit of their processes),
- 2) about making services visible, to learn and communicate about services and
- 3) collaborative.

The purpose of the study was also to take a closer look at definitions, purposes, challenges, and approaches related to prototyping services.

### **5.4.1 Definitions**

The interviews also reveals that service prototyping is not very articulated (some informants were unfamiliar with the term) and not very rigid in the sense that it can be pretty much anything- like an idea, an everyday object or a deliberately constructed artefact or social interaction. To most informants it was also not a specific phase in the design process, i.e. it could happen at any time and place during a project. This is a natural consequence of not having a language- and a process for, working with service prototyping. The fact that there is no actual prototyping phase in the projects is partly due to the designers' clients. For instance, #2 explains that they do not sell projects based on prototyping; it is not part of the specification for projects, unlike e.g. research. It is likely though that this varies a lot between different design agencies. There is also reluctance among service designers to actually work with methodologies or rigid processes, which is evident in other research as well: "[w]hilst some organizations had well-developed and tight methodologies, many successful innovators preferred a more flexible approach. They feared that tight methodologies would inhibit the creativity required for experiential service design and would increase time to market unnecessarily. This suggests that the relatively tight and rigorous methodologies typically found in product innovations may not always be applicable to service innovation." (Voss & Zomerdijk, 2007 p. 3)

### **5.4.2 Purposes**

The main purposes for prototyping reported by the designers were, in different words to; explore, evaluate, and communicate. The potential and still unrevealed knowledge about how to tackle certain aspects of services makes this area one of the more interesting future research areas that can develop tools and methods specifically for the prototyping of services, and for the identified purposes specifically. The area shows great opportunities for improvement and one of the informants even pointed out the lack of knowledge about service prototyping within the community, and another designer said that they, at their agency, need to learn more about how to prototype. Findings along that line underscore the notion that service prototyping is still not wholly formed and needs further development.



### 5.4.3 Challenges

This study also reveals that designers see a number of challenges for service prototyping. A number of specific features of services, and for prototyping in particular, was mentioned; inconsistency, authenticity, validity, intangibility and time. At the same time, most designers did not report any problems in their *own* work in prototyping services, which might indicate that they do not actually address these service related issues in their practice. A problem related to clients was said to be the amount of prototyping that occurs within projects, and showing the value of prototyping services. This problem has also been identified in other service research:

“It seems the main barrier to using design (as well as creativity-and innovation-related practices more generally) in service firms was the perception that it was not relevant: half the service firms expressed this opinion. This aside, the more important barriers were the cost of these activities and the lack of clear tangible rewards.” (Tether, 2008 p. 8)

### 5.4.4 Approaches

The reported practices, and the definitions provided by the informants, varied largely. This means that the description of a service prototype found in Diana, et al. (2009); that any prototype tested in its intended “place, situation, and condition” is a service prototype, could not be confirmed by this research, since most of the descriptions of how service prototyping is actually done deviated from that description. One thing that can be said about service prototyping, and that is corroborated by findings about service design in general (Rae, 2007) is that service prototyping is a collaborative effort. “The quality of the service depends on your collaboration with your customer” #5. To achieve this, the use of prototypes to visualise service concepts and ideas seem especially valuable. This issue will be further explored in Study 3.

Another piece that was largely missing in the interviews was the holistic perspective of services. What is interesting about this is that when asked, all recognise the value of a holistic perspective, but when asked about how they actually prototype, all but one company (#1) talked about single interfaces, products or interactions. This indicates that some knowledge about how to approach service prototyping is missing and that the practice is more reactive than proactive. There is also the question of how much of a priority service prototyping actually is. All informants recognise the importance when asked but only half even mention it as part of their work process. This might of course be due to the fact that prototyping is implicitly taken for granted, or they simply do not prioritise prototyping to the extent they say they do.

### 5.4.5 Future research

This research needs to be completed by observations of actual prototyping cases, to wholly understand the practice of service prototyping. A holistic approach to service prototyping,

that address the challenges suggested in this study, also needs to be developed or brought to light in future research. Especially the issue of how to prototype whole services, in a realistic environment that accurately convey the experience of the future service, is a question that should be further investigated. Responding to this question means developing processes that investigate how new service concepts relate to “servicescapes” (Bitner, 1990) and whole services; “the physical environment, the service employees, the service delivery process, fellow customers and back office support” (Zomerdijk & Voss, 2010 p. 25). This will be addressed in the Discussion, chapter 9, of this thesis.

Another important area is how the value of service prototyping can be measured and communicated to service providers. The design community seem to realise the benefits of prototyping, but lack the tools to convince key stakeholders. More research on how to develop methods for practicing service designers that clearly communicate the benefit of their work is needed. The issue of how to evaluate service prototypes in specific contexts will be discussed in Study 5 (chapter 8), where a process to develop a tool for evaluating prototypes will be introduced and described.

## 5.5 Conclusions

This study has shown that service prototyping is important but not well defined or well-articulated. It has also revealed that service prototypes are used to explore, evaluate and communicate design ideas and concepts. A number of challenges with prototyping services as opposed to products were identified: inconsistency, authenticity, validity, intangibility and time. The perspective of validity is interesting and potentially important for the practice of service prototyping. This thesis will return to a more elaborate discussion about validity in the Discussion (9.1.1.1) and how it fits in the existing prototyping framework, presented in Study 1.

At the moment, service prototyping cannot be said to be one thing but rather a variety of approaches and activities, where most prototypes of services focus on single touchpoints rather than holistic service representations. The attempt to unmask service prototyping should focus on 1) developing a new shared language and conceptualisation of prototyping and 2) arriving at a first description of service prototyping as a well-defined and structured activity, taking the service specific attributes seriously. Both these topics will be explored and addressed in the discussion, chapter 9.

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## 6 Study 3 – Inclusion in service prototyping

This chapter is based on the paper Service designers on including stakeholders in service prototyping (Blomkvist & Holmlid, 2011), abstract and paper peer reviewed and accepted to Include 2011.

### 6.1 Introduction

The professional design of services is highly associated with co-creation, meaning that external stakeholders are many times involved in the design process, which is evident in service design literature. Services are also by nature co-created, in the sense that they are produced and consumed simultaneously through interactions between customers and service providers. This study reveals what designers say they do to involve different stakeholders in the process of prototyping services. The main data source is interviews with designers from design agencies that work exclusively or partially with service design. The study focuses on the questions of “who is involved in creating prototypes”, “who evaluates the prototype” and how “the clients [of the design agencies] are involved”. The study makes a distinction between different types of involvement based on previous literature that characterise different roles and perspectives on inclusion in design. The framework used to analyse the data in this study is based on research by Sanders (2006, 2008) and Holmlid (2009). A more elaborate description of the framework and interview study can be found in the Method chapter (3.2-3.3). Sanders has divided users based on how they are seen by the designers in design projects. An expert mindset views users as subjects, while a participatory mindset views users as partners. Users here can be any kind of stakeholder, e.g. customers and clients. Holmlid has described 3 levels where inclusion can be found in design,

objectives, approaches, and techniques. In the Discussion, these concepts will be used to describe the findings in this study.

## 6.2 Theoretical framework

In 2006, Sanders opened the first issue of *Design Research Quarterly* by characterising design and design research and suggesting that “the line between product and service is no longer clear /.../ the action now is in the fuzzy front end of the design development process with a focus on experiential rather than physical or material concerns; the action in the fuzzy front end is all about new ways to understand and to empathize with the needs and dreams of people.” (Sanders, 2006; p. 1) The response from service design, to the question of how to understand and empathise with the needs of people, has partly come in the form of co-creation and co-design approaches. A way to improve the odds of people having positive service experiences is considered to be to involve them to a larger extent in the design process. (Bradwell & Marr, 2008) discussed the advantages of a co-design approach like this: “Co-design promises to deliver direct, tangible results. For example, if people participate in public service design they are more likely to understand the difficulties in delivery, to sympathise with providers when things go wrong and to complain in a more informed and constructive manner. Furthermore, user engagement at an early stage is likely to reduce design errors, and the costs associated with those errors.” (ibid.) 23 p. 14

Surprisingly, research in academic contexts about the practice of service design has not shown much of the co-designing approaches associated with the field. Most knowledge about co-creation approaches in service design practice so far has been shared by service design practitioners or other, non-academic associations, and largely focused on the early stages of the design process. Previous research has shown that service designers’ characterisation of their prototyping practice is collaborative (Blomkvist & Holmlid, 2010), see Study 2. Collaboration and inclusion in service design is often talked about in terms of co-creation. Though a word often thrown around, the meaning of co-creation is still not clear and there is some confusion about how it is actually done (Sanders, 2006). DEMOS have produced a number of helpful texts on this topic, and provided what they call a definition of co-design with the main claims related to participation being that it is collaborative, transparent in regard to methodology, continuity in regard to participants and welcoming input from a multiplicity of viewpoints (Bradwell & Marr, 2008).

There are many different ways to involve stakeholders, and how users and customers are involved in different design fields is intimately related to the underlying assumptions within the field. Sanders (2008) created a map showing how different design approaches and mind-sets relate to each other by placing them along two intersecting dimensions (see Figure 7). The end-points of the mind-set dimension are expert, where users are seen as subjects or reactive informants, and participatory where users are considered partners or active co-creators. Using a perpendicular dimension of approaches from research-led to design-led,

Sanders was able to map out most of the more prominent design research fields and show that there are many roles for – and ways of including – users in design today (ibid., p. 13-14). For this research, the mind-set dimension polarising user involvement into participants and subjects is of interest and will be of use.

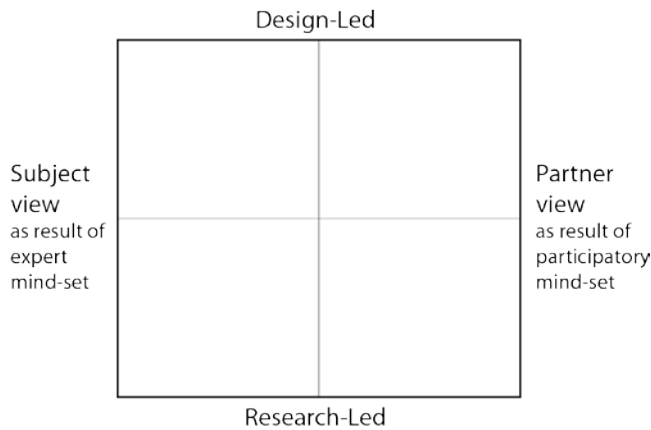


FIGURE 7: DIMENSIONS OF APPROACHES TO DESIGN RESEARCH (ADAPTED FROM SANDERS, 2008).

As mentioned above, the participatory design movement has had a large impact on the co-creation approaches in contemporary design. The steps of the development of user involvement from participatory design to service design have been described by Holmlid (2009). He showed in his work that: “Both [participatory design and service design] base their argumentation on emancipatory objectives; be they democratic, power-driven or sustainability-laden. Both set up and organise co-operative approaches. And finally, both use engaged involvement and pluralistic participative techniques to operationalize these.” (P. 10)

### 6.3 Interviews

As this study attempts to reveal what designers say they do to involve different stakeholders in the process of prototyping services, the study is based on interviews focusing on how service design practitioners prototype services. The analysis in this study focuses on parts of the interviews; the questions of “who is involved in creating prototypes”, “who evaluates the prototype” and how “the clients [of the design agencies] are involved”. A list of techniques mentioned by the informants as techniques for prototyping of services will be presented and used to supplement the answers. The data will also be compared to the different ways of inclusion described in the theory chapter. This will make it possible to say something about the approaches that are described by the informants.

### 6.4 Results

From the interviews the following data was gathered concerning who was involved in creating and evaluating prototypes and whether the client was involved in prototyping;

Table 3. Numbers from #1 to #6 in the presentation of results and in the discussion represent the individual respondents (see Table 1 for more info on the informants).

TABLE 3: ROLES OF THE INVOLVED STAKEHOLDERS IN PROTOTYPING SERVICES

Stakeholder/ Prototype stage	Designers	Clients	Frontline staff	Specialists	Customers	Total
Creation	6	4	1	2	2	15
Evaluation	6	5	0	2	2	15
Total	12	9	1	3	4	

The designers talked about how they work and, in a sense, also how they want to be perceived; “based on how we work, and how we want to work, we constantly want to involve our customers in the process” #2. Many of the design agencies expressed a willingness to involve different stakeholders and some more explicit strategies to inclusion was mentioned, as in “what we know, that is completely central to idea generation, is that the closer to the core team you work, the bigger the potential to generate good ideas that can be done” #1. Or, highlighting the distribution of resources and involvement as in “usually, I think half of the time, we can create a prototype ourselves, the other fifty percent we actively make use of the users” #4.

The following data was gathered in regard to the view of the stakeholders as being partners or subjects, the degree of involvement in the design process. In several cases the informants did not clearly state a partner or a subject view, and these have been classified in Table 4 as exposing an in-between view.

TABLE 4: TYPE OF INVOLVEMENT IN SERVICE PROTOTYPING.

Degree of involvement	Partner	In-between	Subject	Total
	1	5	10	16

The only occurrence of an answer exposing a view of the stakeholder as a partner was an answer describing the collaboration with a client. The informants were also asked which techniques they use in the later stages of their projects. These can be found in Table 5. The category names are a result of a categorisation made by the author and Stefan Holmlid. The



names of techniques have not been changed in any way and are presented as they were reported by the informants.

TABLE 5: TECHNIQUES USED IN LATER STAGES OF THE DESIGN PROCESS. WORDS IN BOLD WERE ALSO MENTIONED IN (SEGELSTRÖM & HOLMLID, 2009).

Workshop techniques	Visualisations	Other	Technology interfaces
card sorts	<b>storyboards</b>	<b>personas</b>	wireframes
create storyboard	<b>customer journey</b>	<b>narratives</b>	<b>mock-ups</b>
future exercises	<b>movies</b>	<b>photos</b>	
envisioning exercises	<b>scenarios</b>	interviews	
paint the picture in words	<b>user journey maps</b>	customer journey lab	
games	<b>service blueprint</b>		
<b>role playing</b>	<b>sketches</b>		
bodystorming	visualisations		
	touchpoint		
	sketches		

## 6.5 Discussion

The aim of this study was to contribute more knowledge about what service prototyping is according to practitioners but focus on the issue of inclusion and how the informants tackle the issue of co-creation. The results will be discussed on the levels of objectives, approaches, and techniques that the informants say they use, more or less explicitly.

### 6.5.1 Objectives

On the objectives level, the level of strategic design decisions it can be said that the designers have intentions of including stakeholders to a larger extent than they actually can, because of economic constraints and the expectations that their clients have. Most of the informants express a wish, or try to convey an image of collaborative approaches such as in:

“we work really closely with our clients and try to involve them ./ It’s not like they give us an assignment and then we return to [our office] and then work for six weeks ./ and then return to uncover the finished product” #2.

Some were exhibiting more of an expert design view though: “not that [customers] necessarily have to do everything but they should be aware of what’s happening and feel that ‘this is a good step to take’” #2.

Given that involvement and emancipative objectives have played an important role for the establishment and growth of the field of service design, it was surprising how few informants expressed such views. A hint of such an emancipative objective was expressed by two of the informants. They said that an important part of their work was to educate their clients, so that eventually they will be able to direct and perform the service design processes themselves “we build this iterative system ./ and teach the client how to do it” #5.

The general attitude expressed in the interviews was that inclusion and co-design approaches are desirable but not always feasible. The problems with including clients come from their expectations and conceptions about design. Clients of the informants are many times not familiar with service design and want more traditional design work. Those that do know about service design are still not prepared to put in time and money for a collaborative project. One informant reported that clients sometimes refuse to take part in the process. Another problem that was mentioned was that projects are not anchored at the right level of service companies, making it impossible to work collaboratively.

### 6.5.2 Approaches

When it comes to the approaches at a tactical level, prototyping in service design seems to be quite similar to conventional design disciplines, where stakeholders are involved mostly as subjects and not as partners. In fact only one answer can be attributed to a view of an external stakeholder as a partner in prototyping, when asked this set of questions:

- Who is involved in creating the prototypes?
- Who evaluates the prototypes?
- Are clients involved in evaluating the services?

To many of the informants the boundaries and definitions of service prototyping is not well defined or developed (Blomkvist & Holmlid, 2010). In the material used here, this affects how the informants report on who is involved in what activities during prototyping, and to what extent. The participation is evenly divided between creation and evaluation of prototypes, which is a signal that the interviewees might not in practice distinguish between roles, expertise, partnership and resources in the different stages.

Partners in the design process contribute with questions and agendas to a larger extent than subjects who merely confirm or disconfirm ideas or answer questions. The following quote for instance, express a view of stakeholders as subjects:

“we work quite a lot with showing prototypes to, show prototypes to users and we do that because we do the design work and are not ./ we get wiser from talking to users and get more secure in our recommendations, so when it's more about how the design should be carried out it is- we often have quite strong recommendations based on our own experience” #6.

### **6.5.3 Client vs. end-customer involvement**

Interestingly a pattern appeared showing that most of the time co-creation was mentioned in relation to the client and not the customer/user. From the interviews it is thus concluded that in service design today, the main stakeholder seems to be the client. When discussing the roles of different stakeholders, the informants talk mostly about the clients, and not so much about the customers. Besides the designers, who are always included, the clients were the most commonly mentioned stakeholder, both in creation and evaluation of prototypes (9 times). Customers were only mentioned 4 times, as many times as specialists were mentioned. In order to get new perspectives, which is crucial with a prototype (Bradwell & Marr, 2008), one informant (#3), said that they use designers to evaluate the prototypes that have not been involved in the creation of the prototypes. They also try to involve people from other industries in the creation of prototypes, for the same purpose.

In conclusion, primarily the client is involved, and more as a partner, while customers are seen as subjects or passive informants. “We have noticed that in the research phase, there are a lot to gain by involving the company we are working for.” #2

### **6.5.4 Objectives-approaches mismatch**

Though a lot of service design literature from companies, showing cases, project an image of service design as a highly inclusive, collaborative and emancipative practice, little evidence of such prototyping approaches could be found. The description of co-design as an activity where co-creation is about teaching the people who work at the point of service delivery to prototype and empowering them as co-creators (Fullerton, 2009) was recognised to some extent in the interview material. But the reported practice related to prototyping mainly indicates a classic role of stakeholders as informants. The fact that the service provider actually delivers the service, and thus is a part of the service experience explains to some degree the necessity to work and collaborate closely with the client.

Sometimes, with inclusion exclusion follows, and some actors were actually mentioned as explicitly excluded from prototyping. These were, on single occasions specialists, actors, special teams and “not the same as the ones who made the prototype” #3. Explicit mentions of exclusion were rare though. When it comes to inclusion it is also imperative that stakeholders themselves actually want to be included in the process for it to work. One informant explained that many times they actually want to work more closely with the

client but that clients are used to working in other ways or that they simply don't have time to be part of the process.

The informants also said that they need to adjust their prototypes according to the needs of various audiences and to how informed different groups are. Despite this, they also say that there is no real difference between internal prototypes, which are used within companies, and external prototypes which are meant to be shown to other audiences. Many also said that prototypes are not used within the agency because the value comes from prototyping with other stakeholders. It was interesting to see that different stakeholders are involved to such large extent in the creation of prototypes. This issue of authorship – of who makes the prototypes – is important for inclusion, since the power to contribute to content affects both the feeling of inclusion and the acceptance of the final prototype.

### 6.5.5 Techniques

On the operative level, different techniques for involvement are used. The techniques in Table 5 were mentioned in response to the question “which design tools do you use after user data has been collected in a typical project?” 8 of the 24 mentioned techniques were typical workshop methods, not necessarily used to involve people but more collaborative than other groups of techniques such as visualisations and technology interfaces. The fact that there are so many visualisation-techniques mentioned is interesting since the question regarded the later stages of design processes. Segelström & Holmlid (2009) have asked about techniques used in the early stages and 12 of them (bold in Table 5) were also mentioned in this material. A lot of the workshop methods were not part of Segelström & Holmlid's material, which is not surprising. Techniques such as interviews and personas do of course imply (in most cases) that other stakeholders are involved, but the role can hardly be said to be that of a partner, but rather as an informant or a subject.

The large number of visualisation techniques mentioned can perhaps be attributed to a general focus within the service design field on the early research stages and visualisations. There are also many techniques developed for idea generation within design and it is likely that more techniques have been developed to facilitate that part of design than later stages such as prototyping and implementation. To be emancipatory in their involvement processes, designers need to think about the ramifications of decisions they make in projects. Techniques they decide to use and approaches to the expertise and knowledge possessed by other stakeholders will affect the outcome and satisfaction of a service; “if people participate in public service design they are more likely to understand the difficulties in delivery, to sympathise with providers when things go wrong, and to complain in a more informed and constructive manner. Furthermore, user engagement at an early stage is likely to reduce design errors, and the costs associated with those errors.” (Bradwell & Marr, 2008, p. 14)

Another power related issue that have been mention is the issue of authorship, discussed at some length in the following section.

### **6.5.6 Author**

For service design to live up to the ideals or standards of the field, it needs to be emancipative in regard to involvement. One perspective that has not been prioritised in this context in the literature is the perspective of who creates and authors prototypes.

There are three aspects of this potentially important perspective;

1. what associations do the evaluators of prototypes have in relation to the author of the prototype,
2. the possibility for users/customers to take part in the creation of prototypes, and
3. issues related to organisational matters such as design management, ownership and resources.

If the designer is associated with the company for which the prototype is constructed, users or other stakeholders that evaluate it might adjust their feedback depending on power relations, ill-will/good-will, personal gains, fears, and so on. In this sense the associations between the author of a prototype and the evaluator is crucial to the level of success of the prototype. Including key stakeholders as authors of prototypes, or other artefacts, arguably empowers them and increases their feeling of commitment. This might be one of the reasons that service designers seem to involve the client more than the end customers in their projects, since their businesses depend on the positive experiences of clients firstly. This discussion about who authors prototypes is a new perspective on prototyping and should be added to the existing prototyping framework. In the Discussion (9.I.I.2), this issue will be further elaborated on and a suggestion for how it fits in the framework will be made.

## **6.6 Conclusions**

This study has revealed what designers say they do to involve different stakeholders in the process of prototyping services. The main contributions are that inclusion many times means the involvement of stakeholders as subjects rather than partners and that the client is the most involved stakeholder. Many times a wish to involve people to a larger extent is expressed but not necessarily feasible, i.e. the objectives are many times emancipative but economic realities and client expectations interfere. Both creation and evaluation or prototypes are done together with others than the design team only.

Techniques for involvement mostly come in the form of workshop methods. Many techniques used by the informants in the later stages are typical research visualisation techniques. The issue of who authors prototypes is raised as an extension of the discussion regarding power relations and different objectives for inclusion in service design. A final

remark concerning the practice of service prototyping is that since service design is cross-disciplinary and relies heavily on co-creation approaches, a lot of people need to be able to take part, evaluate, and understand the design process.

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## 7 Study 4 – Communicating service experiences during design meetings

This chapter is based on the paper Exemplars in Service Design (Blomkvist & Holmlid, 2009), abstract and full paper peer reviewed and accepted to the First Nordic Conference on Service Design and Service Innovation, 2009.

### 7.1 Introduction

This study is based on transcripts of recorded meetings between designers and other stakeholders. The transcripts have been analysed using the notion of common ground and approaches from communication analysis. The study looks at the communication in two service design projects. Observations and audio recordings from projects at the Swedish Customs and the national meteorological institution (SMHI) are analysed. Go to the Method chapter (3.4) for more information about the method used in this study. The aim is to find out if previous service experiences, termed *exemplars*, can be used in design communication, and if so – how. This study will start by giving an overview of what is indicated by exemplars and from what perspectives exemplars have been analysed in previous research. It will then point out specific features of services that might make the study of exemplars different for the service design discipline. The service concept construct (Goldstein et al., 2002), will then be used to provide a framework for understanding how examples influence communication in observations and recorded material from two different service design projects. How to understand the service concept is described in the Method chapter (3.4.1).

## 7.2 Theoretical background

There is a general consensus that *examples* are used by designers, and that they are important in design processes. Under this consensus, techniques such as mood-boards, competitive analysis, and personas are used, and research has showed that metaphors are important in design communication. This study however does not look at “examples” from that common-sense point of view but rather delimits the meaning to referential techniques, calling upon existing elements or design objects, that are brought into the design process to benefit the result of that process. These existing elements can be called exemplars (see e.g. Schön, 1983). As a consequence, this excludes techniques such as personas, which are referential of archetypical users, mood-boards, which are referential to abstract qualities, etc. from the study presented here. Exemplars can be previously made artefacts and experiences sometimes mentioned as being “examples” of something, that can serve as inspiration or that can be repeated in some way to improve the new design. For instance, benchmarking and similar activities (e.g. identifying the service landscape) are common practice in applied service design. In service design research and literature they are largely overlooked however. In the online repository for Service Design Tools (2009), 38 different tools and methods are mentioned. None of them concern exemplars or associated activities.

It is argued in this study that exemplars play an important but academically neglected, or set aside role, in design in a number of ways. In service design literature there is little mentioned about methods and practices that utilise the potential of exemplars. Exemplars can be used to inspire, explore, and analyse possible design solutions and are used extensively by design practitioners. Even though there is some knowledge about exemplars in other design disciplines, there seems to be a need for better understanding of the role of exemplars in service design. In most design fields an exemplar can be a physical thing, like a chair, a painting, a building or a web page, but in service design, the most typical exemplars are experiences. These experiences cannot be shared like physical designs, by showing a picture or a product, but might very well be as important for the result of design projects.

The main focus of this study is to analyse how exemplars are used during actual design discourse - their origin, structure, and for what purpose they are used. In other design fields, exemplars have been the focus of research from a number of perspectives, e.g. how designers use physical examples to support the creative process (Herring et al., 2009), the importance of gathering sources of inspiration (Eckert, 1997), and strategies for and approaches to adapting different sources in current designs (Eckert & Stacey, 2003). Designers use a wide set of tools and techniques of which a subset are referential techniques. Using different terms, it has been suggested that exemplars can be used to, e.g. help designers understand design languages (Rheinfrank & Evenson, 1996) and genres (Dearden, 2006). That they are used to inspire (Herring et al., 2009), and provide a repertoire of design solutions (Löwgren & Stolterman, 2004). Another theme that is common is reuse, which stretches back to



Christopher Alexander and the development of design patterns. The ability to reuse prior work can be seen as a characteristic of a mature discipline (Hornsby, 2009), which also allows for adding and modifying previous elements and designs to fit the existing situation. For instance, the teaching of architecture is grounded in concrete exemplars and early in education students learn about the great genres and exemplars of history to understand the timeless components of design elements (Winograd & Tabor, 1997; Schön, 1983).

There is some evidence that exemplars are used to improve the outcome of service design projects. These examples are however instances where explicit strategies for how exemplars should be used to benefit the current design process. In his ambitious master's thesis, Moritz (2005) mentioned 102 tools and methods put forth by the service design community. Four of these have at least theoretical connections to exemplars:

- Try it yourself – designers try out existing services as exemplars for designing new or improved services
- Mystery shoppers – similar to try it yourself except someone external is sent out to try out a service
- Inspirational specialists – especially useful or successful features of other services are used as inspiration for the development of a new service
- Benchmarking – quite explicitly focuses at previous solutions

Looking at design as a whole, inspirational specialists seem to be a valuable and common way of dealing with specific service elements. An example comes from The Mayo Clinic and their SPARK programme, where inspiration about how to handle the check-in process of the hospital came from the check-in process of the airline industry (Saffer, 2007). Research so far has mainly concerned surface properties of exemplars, and explicit accounts of how exemplars are utilized in design practice (Herring et al., 2009; Eckert, 1997; Eckert & Stacey, 2003). In these cases the exemplars serve as common reference points that help designers co-ordinate activities and facilitate communication.

An assumption behind the study is that service experiences, that do not have the same physical nature as products, also can be beneficial as exemplars for the design of services. The study also looks explicitly at how exemplars are used in communication, and not as an explicit technique or strategic approach in the design process.

### **7.3 Design as communication**

Given the nature of services, and the service designer's reliance on co-design methods and visualisations (Segelström & Holmlid, 2009) the design process can be viewed as a communication process. Co-designing means involving different people with different backgrounds which might lead to communication problems. A way to cope with such problems is to use more universal ways of communicating, such as storytelling which is a

way of involving non-designers in the design process (Strom, 2007). Vaajakallio (2009), among others, have called for more detailed observations of how people collaborate and communicate in co-design situations. Communication helps designers and teams to collaborate, and one approach to design is to see it as fundamentally a process of communication: “It is useful to think about design as a process of communication among various audiences.” (Erickson, 1995; p. 2)

An important part of collaboration is the ability to communicate effectively and having a agreement on the rules for cooperation (Andriof & Waddock, 2002). Research contributing to the understanding of how communication is facilitated in service design has also been published by Segelström et al. (2009). When it comes to prototyping and how different stakeholders are involved there is less to be found in the existing body of service design literature. As a way to communicate effectively designers use scenarios and prototypes as boundary objects (Johansson & Arvola, 2007). Physical exemplars are also used as boundary objects, and as such they make communication more effective (Eckert & Stacey, 2000). A similar logic can be applied to prototypes since they also facilitate communication (Erickson, 1995). As with prototypes, exemplars of services cannot be described in reference solely to external aspects. Instead they must be described also as experiences and impressions of the relationship between the customer and the service provider. New tools for, e.g. visualisations, have been developed that address the temporal, complex, and intangible aspects of services, for instance design documentaries (Raijmakers et al., 2006) and customer journeys (Kimbell, 2008), but no similar methods or tools exist for utilising the potential of exemplars.

## 7.4 Result

The recordings from the design meetings have been transcribed. For more detailed information about how this was done, go to the Method chapter (3.4). In this analysis, unfinished sentences are signified by three dots (...). Comments or remarks made by the author are put within square brackets []. Where episodes have been skipped it is signified by this notation /.../. The excerpts should be read literally as service experiences, and not as metaphorical or analogical. The idea of a service concept will be used as an analytic framework here. The excerpts are taken from some of the more interesting sequences in the material where exemplars were mentioned. In this section the example and the emotional response have been underlined because those are the parts of the excerpts that are most interesting for the analysis. The excerpts have been collected half-way through the design project at the Swedish customs. The results have been divided into three groups:

- Behaviours
- Tangibles
- Gathered data

### 7.4.1 Behaviours

The focus of this kind of contribution is behaviour. As in this excerpt where a service element is discussed from an expectation viewpoint, excerpt 1:

“I think it feels like this; if you don’t get [an email] for all [messages], then it feels to me like it is either-or, so that you don’t get confused and trust that you get a notification to the mailbox every time you get a message in the portal, and then all of a sudden I don’t get one. That could get a little confusing.”

As exemplars in this excerpt the participants use a behaviour – the first underlined bit of the excerpt. The behaviour is described in detail and serves as an example of inconsistency – which they fear may get confusing. The emotional level is added in the following elaborations about the behaviour. The concluding remark is where the (underlined) emotional response is finally clarified.

This was a common way of arguing for the “how” of the service concept. So what the designer is saying in this excerpt is actually that if the customer expects certain behaviour, i.e. feedback, then it would be bad if that was not fulfilled. Implicit in the excerpt is the assumption that similar elements in other services behave this way, which also makes it a good idea to design the service accordingly.

Later in the same meeting, a suggestion based on a previous solution is made. The structure is similar to other contributions where, in this case the behaviour, is first suggested and then the expected response. Excerpt 2:

“At the same time as a message arrives to the account, another message should be sent to their mailbox that ‘you have a message’. It doesn’t matter what was in the letter but it said that there was a new message to be read.”

The fact that last time this behaviour or function was implemented, customers only needed a confirming letter, makes it a good suggestion about how the this service element should behave. The behaviours discussed in these excerpts follow the same pattern as when tangible exemplars were used.

### 7.4.2 Tangibles

This type of contribution was made in reference to exemplars from common ground or personal encounters. The contributor here considers a “‘r’ within brackets” as part of what customers expect because they might have used similar services at the bank. Excerpt 3:

“Think about how it looks at the bank. There is usually a small ‘r’ within brackets, on the... on the edge here... messages [pause] Then you see that something has changed.”

In this example it is the nature of the experience that is implicit, i.e. it is understood that it is good if you can see that “something” has changed. Together with the emotional response, the bank example creates enough understanding of the event for others in the design team to understand the impact on the service concept. In this way, some contributions involving exemplars become arguments for a specific solution.

The tangibles were sometimes also of a more personal nature, as in excerpt 4:

Designer:

“In my inbox there are terrible amounts of mail and that doesn’t bother me because the new ones end up on top. The list goes on forever if you attempt to scroll down.”

Team member:

“Yes it does.”

Designer:

“But I don’t think it’s a problem actually.”

The “yes it does” is not meant as a counter-argument but rather as reinforcement of the designer’s contribution. A previous experience serves as example and an anchor point for the contribution. The indifference to the potentially negative experience of having lots of messages in the inbox is a way for the designer to argue for a specific solution in connection with the service concept.

In this last excerpt concerning tangible exemplars, the existing main page is the example and here it is the information associated with the example that is in focus. Excerpt 5:

“I went online and clicked [the link] on the [existing] main page, and there you get, well, instructions about [another service] and this and that depending on your question. Now I don’t know if that should be here too.”

### 7.4.3 Gathered data

Contributions that involved gathered customer data acted as powerful design arguments. As in this excerpt where a reference to how customers perceived some specific service evidence is made in excerpt 6:

“[The customers] were completely clear about the meaning of the word.”

This is followed by the immediate response:

“Okay, but that’s good then.”

This saves time, because the team can rely on the gathered material rather than go on discussing the matter. When the response “but that’s good then” comes, it’s not only an acceptance but also a way to say “we can leave this topic for now”. All these exemplars are about both the how and the what of the service concept, how the concept should be designed in order to align it with the wishes and expectations of the customers.

Observations from earlier design phases show that questions initially are more directed at the what of the service concept. Questions like “Who am I when I do this?” and “What do I want and how does that matter?” is more common and considerable effort is put into understanding what the service concept should be. In these earlier stages stories play a significant role, e.g. in building a shared service concept.

## 7.5 Discussion

This study has looked at how previous service experiences are used in design communication. The aim was to answer the question: how are prototypical experiences incorporated in design communication? A close examination of the collected data revealed how contributions involving exemplars were made. Regardless of how they were made there were always consequences related to both the “how” and the “what” of the service concept. Exemplars seemed to contribute both to the understanding of options and the value of choosing different solutions. Members of the design team added emotional responses to exemplars to express their value. This was sometimes done explicitly, as in excerpt 1: “that could get a little confusing” which was a straightforward way of saying that it was a bad solution, or implicitly as in excerpt 3: “Then you see that something has changed”, which is meant to imply that it is a good thing that you can see if something has changed. The value of such implicit expressions is understood in the context of the situation. This study was also able to identify the origin, structure and purpose of exemplars.

### 7.5.1 Structure

A pattern was observed of how exemplars were introduced in the observed design situations, roughly following this structure:

- Introduction of the exemplar
- Description of the surrounding context or behaviour
- Implicit or explicit referral to expected associated emotional response

These kinds of contributions will be called *micro-narratives* in this study, to distinguish them from related activities such as planned storytelling, where storytelling happens as a formal and deliberate activity during the design process, through techniques such as storyboards, scenarios and personas. These are planned and premeditated activities. That is, scenarios and role-play are prepared to perform a function in the process. During actual real-time discourse however, such techniques are not available and different strategies must

be used. One common strategy is the enactment of ideas and concepts (Arvola & Artman, 2007; Vaajakallio, 2009). For instance Arvola & Artman (2007) explored how gestures are used and found that interaction walkthroughs and improvised role-play enable participants to describe dynamic, interactive features extemporarily. The presented study complements these studies by showing another way of envisioning ideas and concepts. During actual, real-time design discourse, situated stories are produced extemporarily, on the fly, by participants of the activity.

### 7.5.2 Purpose

Micro-narratives occurred dynamically and continuously. They are utilised for many different purposes (individual and shared goals) and comes from different sources. Shared goals support the collaboration, like informing the team (e.g. excerpt 1 and 5). Individual goals involve arguing for a specific solution, like in excerpt 4. An important point to make is that even though many references point directly to tangible aspects of exemplars, they implicitly concern events. Implicitly they also refer to the complete service experience for different audiences, since all the touchpoints in a service affect the overall service experience. So, when visuospatial elements are referenced in this way it says something about the how of the service concept, but also about the what. Implicit in the excerpts are the value for the new design (i.e. the impact on the service concept) and the situation. Similarly, the micro-narratives help designers go from analysis to synthesis. The exemplars are what Dubberly et al. (2008) would call a description of *what is*, and these are used to inform the work on *what could be*. This is supported partly by involving individual experiences collected during the initial stages of design. This is why individual experiences are so important and micro-narratives allow individual design team members to contribute knowledge about service encounters, thus filling in the gaps of required knowledge.

### 7.5.3 Origin

Exemplars in micro-narratives were retrieved from the research phase (excerpt 6), common ground (excerpt 3), or personal experiences (excerpt 4). A closer look at how the different sources are adapted in new designs and the different impacts depending on source would be a good way to continue this research.

Exemplars that are introduced in micro-narratives also represent more than just the example itself. By saying, “Think about how it looks at the bank” (excerpt 3), it is also implied that a bank is similar in some sense to the current design, and that the bank genre is a potential model for it. Without this exemplar it would take a lot of time and effort to explain all the associated attributes of a bank, but instead the bank can be used as a common reference point. Collecting exemplars to use in design projects could be helpful, much like designers in other disciplines collect and store exemplars. The service design exemplars

would however need to be different in the sense that also temporal and emotional aspects of services would have to be stored.

## 7.6 Conclusion

Exemplars matter to design communication, and potentially to the result of the design project, on the level of analysis applied here. As common reference points, exemplars allow designers to communicate more effectively and understand the emotional level of service elements. At the same time exemplars makes communication more effective when they are understood in their socio-cultural context with associated attributes, values and so on. Micro-narratives are recurring in real-time design discourse and when these narratives involve exemplars they seem to follow a certain structure. The narratives provide a way of correcting and adjusting the service concept, and by doing so, aligning the business intent with customer expectations.

The results found in this study support the understanding of exemplars as a valuable resource in design communication. Since some of the exemplars are used for communicating insights from early stages of the design process they increase empathy for customers and contribute to a better understanding of the service context. However, more research in this area is needed to understand how the potential of exemplars can be better understood and ultimately benefit service design quality. When there is no prototype to talk about in a situation, experiences associated in different ways with service concepts will still be incorporated in communication and matter to the output of the process.

The aim of this study was not to suggest a new method or technique, simply to add to the existing knowledge about what actually goes on during design communication on a more detailed level. When prototyping a service this can be important to have in mind, experiences from previous services are important and prototyping can be seen as a way of increasing the collective repertoire of exemplars. Grounding them in common ground potentially allows designers and other stakeholders to communicate and collaborate more effectively. In that sense, this research has implications also for how to “set the stage” in collaborative design situations where a number of exemplars can be grounded in common ground initially (by viewing or experiencing them together), to benefit communication between participants of various backgrounds and skills.

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## 8 Study 5 – Developing a tool for measuring service prototype experiences

This chapter is based on the paper Developing a tool for measuring the Impact of Location Oriented Prototypes in Elaborate, Interpersonal Services, submitted to British HCI conference 2011.

### 8.1 Introduction

This study will take a closer look at a specific instance of service prototyping. The aim is to suggest a process for measuring how people experience a prototype, for designers and collaborating stakeholders to be able to evaluate it. This is a case study that looks at a prototyping project conducted by a Swedish service design agency. The case is described in further detail in this chapter but more information about the method can be found in the Method chapter (3.5). The suggested process for evaluating service prototypes builds on the assumption that service prototypes, based on user research are manifestations of hypotheses about how behaviour and experiences will change. In this case the desired change was an improvement on patients', and other visitors' experience of visiting the waiting room of the emergency ward at a large hospital. The service in this case was emergency healthcare which of course doesn't start or stop in the waiting room, so the scope of the project was limited to one specific service moment. "We" in this study is the author and Stefan Holmlid, also referred to as the "researchers", unless other details are specified in the text.

## 8.2 Theoretical framework

One of the challenges with evaluating how successful a prototype is in service design, is that the impact of prototypes is complex and difficult to estimate or measure. A way to counter this dilemma is to put more focus on making the hypotheses explicit and testable. This study presents a practical process for using designers' hypotheses to generate survey tools for evaluating the impact of elaborate, interpersonal prototypes in location oriented service systems. This is also a way for designers to verbalize the purpose of service prototypes in a contextual and situated way. The process has been applied to a project where the waiting room of an emergency ward was redesigned. The process and its benefits will be described in detail in this chapter.

Prototypes can be seen as embodiments that manifests design ideas or hypotheses (Lim et al., 2008). In service design, these hypotheses are part of complex and, many times, people-intensive product service systems (Pinhanez, 2009; Ericson et al., 2009). In these systems, knowledge generated within Human-Computer Interaction (HCI), play an important role, often defining central service touchpoints or whole service channels. This knowledge from the HCI field also shows that the hypothesis in evaluation of prototypes is important. The hypotheses are closely tied to the purpose of prototypes; what the prototype should explore, evaluate, or communicate should be reflected in the assumptions about what the prototype is supposed to change. A good understanding of purpose have been suggested as a way to support communication in design (Houde & Hill, 1997). A step towards a better understanding of the purposes, suggested by Houde & Hill, is a categorisation into role, look & feel, and implementation. "Role' refers to questions about the function that an artefact serves in a user's life – the way in which it is useful to them. 'Look and feel' denotes questions about the concrete sensory experience of using an artefact – what the user looks at, feels and hears while using it. 'Implementation' refers to questions about the techniques and components through which an artefact performs its function—the 'nuts and bolts' of how it actually works." (Houde & Hill, 1997, p. 3)

We agree with Houde & Hill in that we need to pose more fundamental questions about prototypes and their purpose but suggest that for prototypes of services, the proposed categories might not be as relevant or sufficient. For instance, the look & feel of the prototype should be divided into separate dimensions, since it is possible to test one without the other, e.g. carrying around a block estimating the size and weight of a mobile unit explores the feel but not necessarily the look of the artefact. An equivalent example for service design might be testing – by role play or bodystorming – a client meeting without the correct props and clothes, thus exploring the feel but not look of the service encounter. The categories suggested by Houde & Hill (ibid.) also does not suffice to answer e.g. relevant questions suggested by Schneider (1996) such as; What does the prototype show? What does it prove or disprove? The answers to such questions, that concern the prototype in itself

should be able to be derived from the purpose of a prototype. A contextual way of dividing purposes for prototyping is to return to the role of the prototype in specific projects. In a study where practicing service designers were asked about their prototyping practices, they mentioned three different purposes; exploration, evaluation, and communication (see chapter 5; Blomkvist & Holmlid, 2010). The research showed that explorative prototypes were used to generate ideas or as learning tools that facilitate collaboration. Evaluative prototypes were used to answer questions and receive feedback on assumptions while communication prototypes were directed at specific audiences to convey the main points of an idea.

### 8.2.1 Classifying the service

This study reports on a project where an evaluation prototype was created to improve a waiting room experience and decrease the number of unnecessary questions to front-line staff. By “evaluation prototype” it is implied that the designers had done research and formulated a plan for what the prototypes should accomplish – before the prototype was built. The prototype was to be integrated in the actual waiting room by changing the content and layout of the room. To further specify what the preconditions for this prototyping project was, a classification is necessary.

Based on existing classification schemes we can say something about the service at hand (see chapter 3.5.1 for a description of how the service was categorised). First of all, the service in this case is healthcare, or emergency healthcare. The first distinction we will make is of where the service takes place. Is the service mainly location oriented or can it take place anywhere? In this case, the service is largely *location oriented* (people must come to the hospital). The project itself concerned a re-design of the existing physical location, and in that sense the project brief actually influenced the classification of the service. It is assumed that this would be the case in all classifications for service design, since projects can concern anything from a single touchpoint design to developing new, or improving existing, holistic services. Since the service was location oriented, the typology for servicescapes was relevant. So, when looking at how the service was delivered and choosing between self-service, *interpersonal*, and remote services, it is clear that the service is interpersonal. The service is also complex, consisting of many elements and artefacts, making the service *elaborate* rather than lean.

### 8.2.2 Challenges of prototyping in this service category

On the basis of the existing plethora of literature, both on atmospherics (e.g. Hoffman & Turley, 2002; Greenland & McGoldrick, 1994) and from the field of environmental psychology (for an overview, see Holahan, 1986), it should be safe to say the the physical design of the service facilities effect people. It is therefore reasonable to assume that changes to that design will also have effect on peoples’ perceptions and experiences and and in those

facilities. Predicting and measuring those changes is however not easy. Techniques have been developed in an academic context that assess the impact of an environment on peoples perceptions. For instance, a measurement technique called Perceived Environmental Quality Indices (PEQIs), which affords a qualitative assessment of the quality based on a group of peoples' experiences related to physical facilities can be used (Holahan, 1986). But rigorous academic measurements are not feasible for practical reasons when designers are contracted to make changes to facilities. Instead they need to rely on quicker ways of estimating or evaluating the impact of their designs.

When attempting to simulate or predict behaviours and experiences in interpersonal and elaborate servicescapes, issues of validity quickly arise. Validity is a term that can be used in service prototyping as a complement to fidelity as a way of describing how well the test situation corresponds to the intended implementation context (Blomkvist & Holmlid, 2010). A similar thought that has been presented is that the aspects; environmental, social, and intervention fidelity of the prototype should be considered (Wellings, 2009). *Environmental fidelity* corresponds to the level of finish in the servicescape. Note that not all services are delivered and consumed in a servicescape, we also have location independent services and servicescapes that are owned by other service providers or even the customers. *Social fidelity* has to do with 1) roles, behaviours, and emotions, 2) rules that govern behaviours and roles, and 1) how people engage and relate to the design. *Intervention fidelity* concerns the artifacts and how they are used and combined in the situation. The validity of prototypes corresponds roughly to environmental and social fidelity, while intervention fidelity has more to do with the prototype in itself. In this case the prototype has high validity, which is correlated with environmental fidelity, since it is already in its intended implementation context.

The challenge with prototyping in servicescapes is not only the many factors that may influence the experience. Aspects of the physical location that affect customers of services also affect the service delivery staff (Bitner, 1992). Many times, the influencing factors are also hard to predict. The experience of eating at a restaurant for instance, is not determined exclusively by the food, it might not even be the most influential factor in judgments of a restaurant visit experience. Aspects such as the design and style of a restaurant, in addition to the food and service play an important part, as shown by e.g. Alonso & O'Neill (2010).

Things that might affect the experience of the servicescape in this case, are waiting time, the cause for visiting the emergency ward (severity of injury/illness), staff and patient behaviour, and so on. Even small changes in the environment have implications for behaviours, such as changing the flow of transactions and supporting certain types of social behaviours (Bitner, 1992). The proposed process for measuring the impact of the prototype tackles this by isolating variables. The process also focuses on a limited part of the whole experience to

tackle the challenge of complexity. This is done by focusing on the hypothesis of the prototype.

Predicting and evaluating improvements of services that are location oriented and complex is difficult. In this case we developed a questionnaire using a process that can be used to evaluate prototypes in these kinds of services. It is suggested that this process can be used by practitioners for two purposes. 1) to facilitate communication in design teams, by making the purpose more explicit and by creating a shared representation of the hypothesis behind the prototype. 2) to evaluate to what degree the prototype has been successful and thus enable designers to show the impact of their work on the service experience. The process is not intended for all types of services since there are many different ways to co-produce services. The first step is therefore to identify what category of service we are talking about.

### 8.3 Contextualizing the case

The project started when a Swedish design agency approached one of the biggest and most prestigious hospitals in Sweden with a proposition for a design project. Our role as researchers in this project was as a third party – we did not take part in the design activities. The hospital had already been planning to make changes to the existing waiting room at the emergency ward. Hence it was agreed that in the first phase, the design agency would do a short research study leading up to a number of recommendations for the emergency ward. After this phase there were some negotiations with the hospital and the second part of the project, which was supposed to be a prototyping phase, was delayed. This meant that when the project got started again, the designers decided that too much time had passed and they needed to do another, short research effort, see Figure 8.

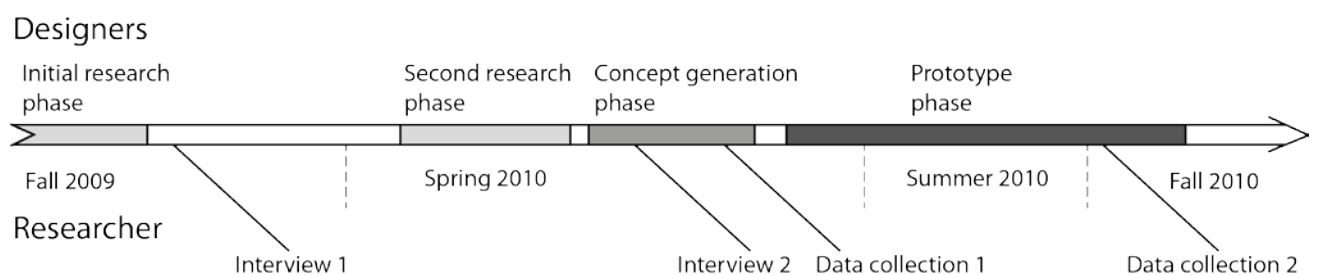


FIGURE 8: VISUALISATION OF THE CASE PROCESS, DIVIDED INTO WHAT THE DESIGNERS AND RESEARCHERS DID.

The progression of the project was followed by continuous updates in the shape of design documentation, notes from meetings, and email conversations. In total, 3 interviews with 2 different designers were conducted at two separate occasions, see interview 1 and 2 in Figure 8, (see also chapter 3.5). One interview was conducted after the first research phase. A presentation the designers had held for the hospital was sent to us after the interview. The same designer was then interviewed after the next research phase when also another designer was interviewed. The interviews only had one purpose; revealing the designers'

assumptions about the prototype, problems and solutions. The format of the interviews were thus open but started with questions about problems, what they wanted to do (i.e. to prototype), and finally what parts of the prototype that would achieve their goals.

## 8.4 Design research

In the following section some of the results from the research study performed by the agency will be presented. A short introduction of the waiting room of the emergency ward and the main problem areas found during the research phase will be presented in the following sections.

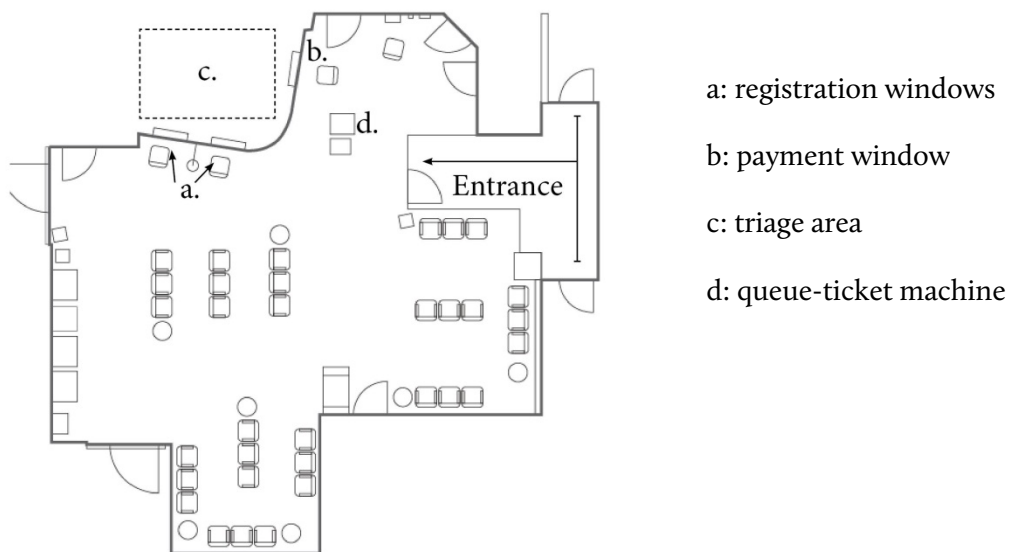


FIGURE 9: OVERVIEW OF THE WAITING ROOM WITH IMPORTANT AREAS MARKED.

### 8.4.1 The emergency ward waiting room

The waiting room (see Figure 9) served both as registration and waiting room. There was a registration desk with two registration windows (a) and a window for payment (b). The desk ran along the glass covered triage area (c) and was located straight ahead on the right hand side when you entered the room. Before approaching the registration counter visitors were supposed to get a queuing ticket from a queue-ticket machine (d). When a visitor's number was shown on a display it was time to walk up to the registration window and sit on a chair in front of it while stating the purpose of the visit. After that, visitors were supposed to get up and walk over to another window to pay the standard fee for a visit to the ward. After that, they were asked to sit down until their name was called. However, if chest pains or shortness of breath was experienced, the visitor was supposed to walk directly up to the counter and ask for help. The designers had used a combination of observations, of the people coming in to the waiting room, and what they referred to as eavesdropping, after deciding that interviews were not useful in the quiet room where people did not feel like



talking – especially to strangers. This approach revealed 3 main problem areas; information, registration flow, and environment.

#### 8.4.2 Problem area: information

There was too much information in the waiting room. The staff had put printed papers in all sizes on doors, walls, and pillars mixed up with official information from the hospital and information about travels and other situations. The sender and intended recipient of the various messages in the room were not clear and this also affected the ability of visitors to know what to do to get a queue ticket. Because there was so much irrelevant information, people did not see the important information, such as where to get queuing tickets or what to do in an immediately life threatening situation.

The information that patients actually wanted to get was only partially available, if at all, in the room. For instance, the ward informed about how to find a psychiatrist, where to smoke and not, particular infections, how to get a taxi and so on. People on the other hand, wanted to know where they were, why the vending machines didn't work, how much longer they were going to have to wait and so on.

#### 8.4.3 Problem area: registration flow

Partly as a consequence of the information overload people also had problems with doing everything in the intended order. Abundance of information and confusing spatial layout lead to problems with the process of registration and how to behave during the first few critical moments of entering the room. For instance, it was difficult to see the difference between where to register and where to pay. Many just walked up to the registration window or formed a queue behind others because they did not understand the intended flow. More alarming, there was a risk that seriously ill people would wait for a queuing ticket instead of walking directly up to the window. Also, some people stopped right after entering the room with confused expressions, thus preventing the flow through the room additionally.

#### 8.4.4 Problem area: environment

The last area of problems was the environment and how people experienced it. The perception of the room, as interpreted by the designers, was that it was

- **cluttered and messy**, which made it difficult to see structures and routines leaving a disorganized impression
- **hard to get clear instructions**, communicating a lack of clarity
- **messy, worn, and untidy**, which was interpreted as unsanitary
- **mixed materials**, making it feel like a home environment which made the place seem unprofessional and
- **missing a holistic approach**, making it feel low prioritized.

## 8.5 Goal orienting the evaluation

This section will describe how the process is suggested to work by using this specific case as an example. The process to define the evaluation instrument is comprised of three steps and starts before the actual prototype is created, after the initial research phase. The process describes the steps involved up until the moment when the questionnaire is finished and ready to use. Documents generated during the project were sent by the designers to us and we also had contact regularly throughout the second phase of the project through mail and telephone/Skype. The phases of the project were initial research, second research, concept generation and prototyping phases. Somewhere in the middle of the second research phase, when the designers had decided what to do and how, the interviews were conducted to start the construction of a hypothesis structure.

### 8.5.1 Building up the hypothesis structure

The first step of building a hypothesis structure involves a thorough investigation of the assumptions behind the prototype. This should be done already when the original idea for the prototype is generated and formulated. The purpose of doing this is to make the assumptions verifiable so that it can be decided whether the prototype actually had its intended impact. It is valuable to know what aspects were affected and if the prototype accomplished to do what it was supposed to do. In this study, the assumptions were made explicit through interviews with the designers after they had gone through the initial research phase and concept generation. The subsections of the first step were;

- extracting the emotional keywords
- finding bridges, and
- organising themes.

First we extracted emotional keywords. We started with the designers' interpretation of how the concerned stakeholders felt during their time in the waiting room. When developing a new service it is hard to tell how people will react to it but experience prototyping (Buchenau & Fulton Suri, 2000) helps understand and predict how they will interpret and experience the new situation. To find out what the designers thought of how people experienced the emergency ward waiting room we asked them to explain, in their own words, what affected the experience and what the emotional response might have been. This resulted in a number of words loaded with emotional or experience related values. The words were e.g. frustration, confusion, suspicion, understanding, trust, insecurity, (feeling of) security, and relaxation.

Notice that there were both words with negative and with positive connotations. This is because the designers started talking about solutions and problems interchangeably. So when they said that information overload lead to confusion, they also said that the right information at the right time makes people feel secure. This is how the argument and the

structure of the hypothesis were built (see Figure 10). To find the thing that made the situation better we looked for the bridges between the negative and positive keywords. So in the example with information overload for instance, a new and improved information sign was the bridge. When those bridges got repeated or when similar bridges occurred, themes emerged. The bridges were identified by the researchers after the interviews and without involvement from the designers. This was a way to analyse how well formulated the designers' ideas about the prototype were. It is probably a good idea that the designers perform this activity themselves so that they can make their assumptions explicit and share their ideas with each other. Once the thoughts about the emotional impact were clarified, it was time to verbalize which aspects of the experience that the prototype would affect.

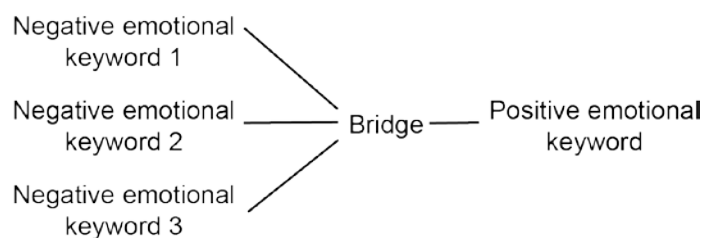


FIGURE 10: HYPOTHESIS STRUCTURE EXAMPLE

This was done by organising themes. Based on interviews with the designers, there were four areas that they felt were more decisive for the experience as a whole and for a successful prototype, than the others. These were *entrance information*, *queuing*, *behaviour*, and *questions*. The relationship between the reported feelings and the categories were not always as clear as in the example above with confusion – information – security, and it was not always a direct relationship between for instance queuing and frustration, but the designers had an idea about how improvement within these areas indirectly would improve the experience or change the behaviour in a desired way. Besides looking for bridges to find themes we also asked them explicitly about what they wanted to change with the prototype and how. This was a helpful exercise for the designers because it made them verbalize their implicit assumptions about the prototype.

After the interviews we could conclude that the work of the designers was intended to result in better and more easily available information by the entrance, a clearer idea of visitors about how long they were going to have to wait, knowledge among visitors about what to ask the staff about and what not to ask about, and finally how to deal with registration. To achieve this, the designers choose to move the queue-ticket machine so that it was the first thing visitors saw when entering the room and they also changed its appearance so that choices were more clear. The designers also redesigned a lot of information in the room and took away unnecessary information. Important things and official information from the hospital were gathered in one place along one of the walls in the hospital. At about the same time, new televisions were installed in the waiting room and minor redecorations occurred.

A strategic choice was made to also move the food dispensing machines. Those were the major changes in the room as a consequence of the prototyping phase. The next step was to start constructing the questions for the questionnaire.

### 8.5.2 Formulating questions

The creation of questions to test the hypothesis is the most time consuming step. Here, questions that test if the prototype will achieve its purpose should be constructed. What a good question is and how it is formulated is not a simple thing to decide. First of all it is crucial that a good scale has been chosen. In this case, respondents were asked to report their level of agreement with statements, ranging from strongly agree to strongly disagree. Questions were then developed that answered aspects of the different areas the designers wanted to improve; entrance information, queuing, registration, and behaviour.

Most areas had specific aspects that the designers wanted to change. For instance, when it came to the information in the entrance they wanted to find out if people would immediately understand what to do when entering the room. The queuing area had two different aspects that the designers wanted to change; knowing how long waiting time and knowing the position in the queue. They also wanted to decrease the number of irrelevant questions for the staff such as issues concerning queuing, directions, phone numbers and so on. Questions that could be distilled from the designers' hypotheses about behaviour were closely tied to questions about the entrance information. The designers wanted to know if people would know how to behave in relation to the intended process of getting a queuing ticket, sitting down and waiting, approaching the registration window and then moving over to pay in the final window.

We wanted the process of filling out the questionnaires to be quick and easy and decided to only have a few questions for each area. The questions were balanced so that there were two questions for each area; one positive and one negative. Formulating the questions, and mixing them, as positive and negative prevents respondents from just answering mechanically in the same way. The final questions looked like this.

#### Entrance information

- It is clearly instructed what to do to get the correct queuing ticket
- It is difficult to know where to go depending on errand

#### Queuing

- I have good idea of how long I will have to wait
- It is unclear what my place in the queue is

## Questions

- It does not disturb if I ask the staff about something I wonder
- It does not feel right to interfere in the staff's work with questions

## Behavior

- It is difficult to know how to behave when you enter the room
- It is clear where to go when you come into the room

### 8.5.3 Making the questionnaire

When making the questionnaire, the information to respondents and questions you want to pose need to be carefully considered. In our case it was imperative that the information about how to fill out the questionnaire and who was asking the questions was easy to understand. The initial text basically said that we were collecting data about how the waiting room of the emergency ward was experienced as part of a research project, and that we needed some help, and would be thankful for information that help us understand how to improve healthcare. The whole questionnaire fit on an A4 (Appendix B) page with information and questions on the first page and more questions and the SAM tool on the other side. We included a highlighted sentence that participation was anonymous, and we also informed them that we were gathering data for a project run by the university.

Pilots of the questionnaire were constructed. Both the questions and the information were changed continuously to arrive at comprehensible and straightforward questions. The questions were tested on colleagues and on students just to make sure they were understandable. Each time the questionnaire was tested new things came up, but after three or four iterations the amount of feedback started getting smaller and concerning small details where it was more a matter of personal preferences than actual misunderstandings. To find out what information about the respondents to ask for we thought about the situation and context for data gathering as well as what we thought could affect the responses. We decided that we needed to know whether the respondent was a patient or not, how long waiting time, if they had been to the emergency ward previously and how long ago that might have been. Those were the only four questions about the respondents. Those questions were asked to find out how big the influence of waiting was on overall judgments and to be able to know whether they had been to the emergency ward previous to or after the first prototype was in place. It is also reasonable to think that the experience can differ between patients and their kin or friends that accompany them.

The questionnaire only had one open format question, which was; What in the emergency waiting room has had the largest impact on your experience? This question was meant to help identify variables that might have had a large meaning for the interpretation of the final results. After making sure that the font size was big enough and legible, without

ambiguous formulations, the questionnaire was ready to be used. The questionnaire worked well on its own and did not need much introduction in the waiting room which made it easy to collect data. The first data collection was made before the prototype and the other collection was made while the prototype was in place. Since it is important to isolate variables we used the same phrase to initiate contact on both occasions, and we collected at similar time of the month on the same day of the week both times.

### **8.5.3.1 Self-assessment manikin, SAM**

In addition to the questions derived from interviews and material generated by the designers it was clear that we needed some information about the actual experience, the emotional consequences of visiting and spending time in the waiting room. The prototype that was created did not directly have anything to do with the emotional effects of being in the room but many aspects of the room was thought, by the designers, to have an indirect impact on the experience of being there. When using a questionnaire it is however impractical to ask for secondary effects, if the hypothesis is that people will understand the intended flow better, ask if they understand the flow better and not whether they feel more safe.

In this case, most of the things the designers wanted to do, in their opinion have implications for the experience. To find out on a more general level whether the prototype changed the experience we used the Self-Assessment manikin (SAM) measurement tool (see Appendix A). Measuring emotion can be done in a few different ways. Generally speaking, there are two approaches to explain and categorize different types of feelings and their relationships to each other - one discrete and one dimensional approach (Capota et al., 2007). The discrete approach divides all feelings into separate emotional states. The SAM tool uses a dimensional scale where the assumption is that emotions can be identified in a space defined by the three dimensions pleasure, arousal, and dominance (Bradley & Lang, 1994). Using pictures to facilitate affective reports, the SAM tool allows subjects to report their emotional responses. This was a good complement that was unrelated to the specific prototype and would indicate any positive or negative effects of the prototype.

## **8.6 Results**

The results will focus on reflections on the process of creating the questionnaire and what that process meant for the project and for the prototype. It should be stressed that this is supposed to be a pragmatic approach that can be used by people who are not used to conducting this kind of research, which influences the approach and scope of the process. The main advantage of using this process is that the hypothesis becomes explicit and that it allows testing and evaluation of specific assumptions. The first part of building the hypothesis structure mainly helped with verbalising the designers' view of how people

experienced the waiting room. This is an interpretation of how others might feel and experience things that is usually done in service design by visualising the customer journey. However, there is no step in the “usual” process where these interpretations are discussed thoroughly or arranged in a structure linking the experiences and assumptions about their cause and effect.

### **8.6.1 Building up the hypothesis structure**

Throughout the project, the hypothesis and interpretations of what needed to be done changed a bit. The initial assumptions that the designers made were later reassessed and the initial problems were not necessarily prioritised in the solutions. This is common in design projects; the problem and solution is gradually uncovered simultaneously. This was also obvious in the work with finding bridges. It highlighted how natural it is for designers to think about the problem and the solution simultaneous; when asked about what problems they had discovered during the research phase the designers usually started talking about solutions interchangeably. When trying to construct a hypothesis it is better however to keep those separated. Being clear about what a problem, or problem area, is makes it easier to organize the assumptions into themes. This exercise was also a good way for the designers to make explicit connections between problems and solutions. Looking at the result however, reveals that the connection between problem and solution was not entirely matching; indicating that more work could be done with making this relation explicit.

### **8.6.2 Generating the questions**

Since the designers did not have a clear hypothesis structure, the relationship between problem and goal was sometimes unclear. This could be observed by looking at the designers’ documentation and comparing it to the suggested structure. This meant that a choice between asking for problems and asking about the things that the designers explicitly said they wanted to change had to be made. In this case we chose to generate questions based on what the designers wanted to achieve, even though the connection between problem – prototype – solution was not always clear.

It was surprising how limited the scope of what the designers wanted the prototype to achieve was. They basically only had a small number of areas that they thought they could affect; entrance information, queuing, questions, and behaviour. Even though these areas are quite broad, the more specific questions for each area were limited. There were also a lot more information about problems in their own documentation than came out during the interviews. The designers had identified many problems with the experience of the room in their research data and problem areas, but the behaviour influenced by problems with information was the only thing they worked with in the end. So, a rich material turned into a quite limited hypothesis. Working more with the assumptions and linking research data

with actual solutions or features of the prototype could potentially be a way of generating more ideas and facilitate communication.

### 8.6.3 Making the questionnaire

The designers' assumptions mainly concerned the cognitive side of the internal responses of people visiting the waiting room. The cognitive responses were then assumed to influence emotions. For instance, not knowing what to do when first entering the waiting room was supposed to make people feel anxious and out of control. Effects on behaviour associated with being anxious were not discussed, and thus not included in the questionnaire. So, the problem of identifying a connection between problem and goal was a problem also when making the questionnaire.

Formulating the questions was also difficult because when doing it the quick and dirty way, it is hard to know if people will answer the question you are asking, and if you are asking the question that the designers need to know the answer to. The designers never said "ask this and that question", they reasoned about what they wanted the prototype to do and tried to connect the different experiences and the features of the room and the prototype. From that the questions became clear gradually but with training this process would probably be more fluent and easy. After the interviews we were left with a structure and some concrete points that the designers wanted to improve, and from that the questions were created. It did however take around four iterations before we were confident that the questions and the questionnaire would work.

## 8.7 Discussion

Making the hypothesis explicit and being specific in terms of the purpose of the prototype has been said to benefit prototyping (Houde & Hill, 1997). The results in this study indicate that the awareness of what the prototype actually was supposed to achieve was low. The designers were hoping for "improvement" in general rather than specific changes that affect the experience. One reason why Houde & Hill (1997) suggested that more emphasis should be placed on the purpose of prototypes was that interactive computer systems are complex. Considering the additional complexity and scope of services it is extra difficult to pinpoint what prototypes are expected to achieve. Dividing service prototypes into categories such as look and feel, role or implementation might not be helpful. It would not make sense for designers to try and divide or categorise the prototype in role or implementation, since the prototype could not say something about any of those categories exclusively. Nor would it be possible to talk about look and feel as a category because they are different, and they can both be manipulated on separate scales of fidelity (McCurdy et al., 2006). For a prototype that attempts to capture the experience of a service, or a confined area of service delivery facilities like in this case even, the categories suggested by Houde & Hill (1997) are too broad and vague.



One way of dealing with this is to be more explicit and specific about which aspects the prototype should affect. To be useful, the process must also be pragmatic and easy to use by anyone. This has been a guiding principle in this study. On a more general level, the aim has been to answer the research question how can service prototypes be evaluated? The process suggested as an answer in this study is not all-encompassing but has credibility in the proposed specific service category. It is impossible to prototype everything at the same time in a service, without actually creating the complete service proposition. But since services are made up of so many different things you might want to prototype them in a holistic manner. Doing so means that you might be testing the role, implementation, look, and feel in parallel but in different aspects of the service. It might be information material, social interactions, colors, artefacts, and so on.

The division of purposes into exploration, evaluation, and communication allows for a first simple categorisation of prototypes in service design. The prototype in this case was an evaluation prototype that had specific challenges as a consequence. Hypotheses behind prototypes are arguably most important when the purpose is to evaluate. This meant that the hypothesis needed to be more clear because the point was not to generate more ideas or knowledge, as with an explorative prototype. Similarly, the idea was not to convey an idea that would improve collaboration or increase the insight into the project for other stakeholders, as in communication prototypes.

## 8.8 Conclusion

We have suggested that this process can be used by practitioners to facilitate communication and evaluate prototypes that are location oriented, interpersonal, and elaborate. This research shows interesting tendencies and a way to approach and verbalise the hypotheses behind prototypes. The challenges with this kind of service is that it is hard to decide whether the prototype is successful due to complexity of variables. The proposed process for measuring the impact of the prototype tackles this by isolating variables. Another way we dealt with the complexity was to focus on a limited part of the waiting room experience by asking for the hypothesis behind the prototype. The other alternative would have been to only ask general questions about the experience of the room. This would have been an approach that didn't say anything about what the prototype specifically had contributed. This method for thinking about the purpose of prototypes in information systems that are not confined within the borders of a computer has the advantage of being more specific. It allows designers to talk about the purpose and potential improvements in a language that is detailed and relevant to the existing situation. In this case, it was clear that the designers are not trained to think and talk about prototypes in terms of actual areas of improvement. Their process was more based on a feeling grounded in the user studies performed earlier in the project. The assumptions they made about the prototype was limited and concerned only parts of what they had identified as problems.

## 8.9 Study 5 references

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## 9 Discussion

Following the studies we will now go through the results and highlight important contributions. In this chapter the research questions will all be addressed and the contributions made by the studies will be highlighted. This means that the prototyping framework introduced in Study 1 will be presented and complemented with additional perspectives. A first tentative suggestion for a service prototyping process will also be presented to answer the last research question. The process will be based on the results in the individual studies and propose ways to deal with the identified challenges for prototyping services. Some suggestions for future research areas will be made followed by concluding remarks.

### 9.1 Contemporary prototyping research

The first research question was *What does contemporary research say about prototyping and prototypes?* The answer to this question was a framework of perspectives from which prototyping had been explored in academic literature. In Study 2, a number of challenges for prototyping services as opposed to products were mentioned. A secondary question, which is interesting for this research endeavour, is what knowledge and which perspectives are suitable for prototyping services. Based on what we learned in the interviews about the validity and author perspectives a new framework can be constructed. The resulting framework of perspectives, with the validity and author perspectives, allow us to say something about what to consider when constructing prototypes or setting up prototyping activities. The final framework is part of conceptualising service prototyping and hence also adds knowledge to the question of what service prototyping is. The framework will be presented after a discussion about the challenges and additional perspectives.

### 9.1.1 Challenges for service prototyping

How well the existing knowledge about prototyping meets the new challenges is explored further here. The challenges that have been identified are associated with *inconsistency* in service delivery, *authenticity* of behaviours and contexts, *validity* of the evaluation environment, *intangibility* of services as design material and the influence of *time* on the service experience. Some of the mentioned challenges can be directly addressed by existing prototyping approaches while others seem to be a little more problematic. Intangibility is addressed by the framework in the shape of techniques such as e.g. *experience prototyping* (Buchenau & Fulton Suri, 2000), various types of *role playing* (Sato & Salvador, 1999), *bodystorming* (Oulasvirta et al., 2003), and *design games* (Brandt, 2006). Such techniques also reveal that prototyping is no longer limited to physical objects or interfaces, but now also concern human experiences and involve social relations and multiple stakeholders (see also Kurvinen et al., 2008). These techniques also serve as examples of how prototyping is moving “away from the traditional design disciplines that are founded on the materiality of the artefact (graphic, product, space, software, architecture, etc.) and instead [organized] around human experience domains such as learning, creating, healing, living, working, playing, shopping, etc.” (Sanders, 2006, p. 30).

In the framework, the perspective of representation deal with many of the aspects of servicescapes but in service design, representation needs to be approached holistically, by looking at how the different touchpoints fit together and how the tangible parts of the service relate to each other. Inconsistency and time are different sides of the same problem in a sense. They both are results of the dynamic and complex nature of services. To deal with these challenges, designers need to employ a holistic approach to service prototyping that involve many stakeholders and try to capture whole service experiences that take place over time and is distributed over a lot of different individuals. Knowledge about how stakeholder involvement is different in service design (Blomkvist & Holmlid, 2011), and ways to approach participatory prototyping (Brodersen et al., 2008) has been generated recently. The perspectives of inconsistency and time are addressed by the suggested process for service prototyping, chapter 9.5.

The remaining challenges are authenticity and validity. They are addressed by the validity perspective that is added to the existing framework. This perspective will be further developed here. Study 3 focussed on inclusion in prototyping and highlighted the perspective of who *authors* service prototypes, which will also be elaborated on. The reported challenges and perspectives need to be met by the existing tools and methods for prototyping, or we will need to develop new approaches.

#### 9.1.1.1 A new perspective: validity

The concept of validity is closely related to fidelity but concerns the larger context of implementation, use, and location, as well as the inclusion of actual people. The validity of

prototypes depends on how similar the test and implementation contexts are. This means that ideally you want all the stakeholders present already during prototyping. This helps avoid the risk that: “prototyping may ‘oversell’ the system by creating unrealistic expectations.” (Ilvari & Karjalainen, 1989, p. 42; see also Alavi, 1984). It also helps by training the front-line staff in delivering the service and by decreasing the risk of unforeseen problems associated with inconsistency and time. For service prototypes, and the context of evaluation, it is important that aspects of the servicescape and the complex network of actors are consciously considered. The setting should ideally approximate the intended implementation context as closely as possible. This improves the reliability of feedback during evaluation (Convertino et al., 2004) and potentially increases the usefulness of ideas generated based on the prototype. Working with authentic people and situations is important for service designers. Some choose not to use role-playing techniques because it doesn’t generate realistic responses and data. This is also why some refrain from using personas; because they feel it will stereotype people – a question raised also in academic contexts recently (Turner & Turner, 2010).

Another aspect associated with the inclusion of stakeholders in prototyping services is who authors the prototype (Blomkvist & Holmlid, 2011), and what that means for the power relations. Author is the second and final suggested improvement to the existing prototyping framework.

#### **9.1.1.2 A new perspective: author**

The creator, the author, of the prototype is not a prioritized perspective or consideration in the literature. There are three aspects of this potentially important perspective – one is what associations the evaluators of prototypes have in relation to the author of the prototype, the second is the possibility for users/customers to take part in the creation of prototypes, and the third is related to organisational matters such as design management, ownership and resources. If the designer is associated with the company for which the prototype is constructed, users or other stakeholders that evaluate it might adjust their feedback depending on power relations, ill-will/good-will, personal gains, fears, and so on.

In one case, a design team worked together with a service provider that managed some of their customer relations in an office. The designers put a machine in the office that allowed customers to carry out some of their errands. The front-line staff however, perceived the machine as a threat that might potentially replace them. To deal with the situation, the staff put signs on the machine during the prototype phase, saying that the machine was out of order. This was a case where the people behind the prototype were not trusted and of course led to problems with evaluating the new solutions. A way to tackle this might be to involve more people, like the front-line staff, in prototyping to increase trust.

A co-design approach to prototyping means that different stakeholders need to be able to take part, evaluate, and understand the design process. A suggested way to do this is to make service prototypes as transparent as possible: “it should be transparent to all actors during the

design process. In service design, the prototype is more a glass box than a black box. Practitioners should make prototypes available to discussion and dialogue, both internally in relation to teamwork and externally in relation to clients.” (Saco & Goncalves, 2008, p. 18).

When it comes to ownership within an organisation, traditionally designers have been functionally organized (Svengren, 1995). That is, graphic designers have been working at the PR-department, industrial designers at the product development department, etc. Prototypes and prototyping in consequence, have been an issue for a functional sub-unit in organisations. A service prototype, on the other hand, has no such functional home-ground. In service driven organisations the service offering, which is the object of the prototype, is a matter for the operative core of the organisation as well as the strategic management, which calls for careful and deliberate holistic prototyping.

### 9.1.2 The resulting framework

The perspectives of validity and author are suggested as helpful additions to existing knowledge on prototyping. This results in a final framework that can be seen in Figure 11. To recapitulate some of the main points of the existing framework, the top part represents the prototype in itself, and is placed on top of a level representing how the prototype is used – what technique is being utilised to test or generate knowledge. This step is not always defined by existing techniques but there is always some kind of prototyping activity that happens around the prototype. The activity is also directed at an audience of some kind, that is, the target of the prototyping activity.

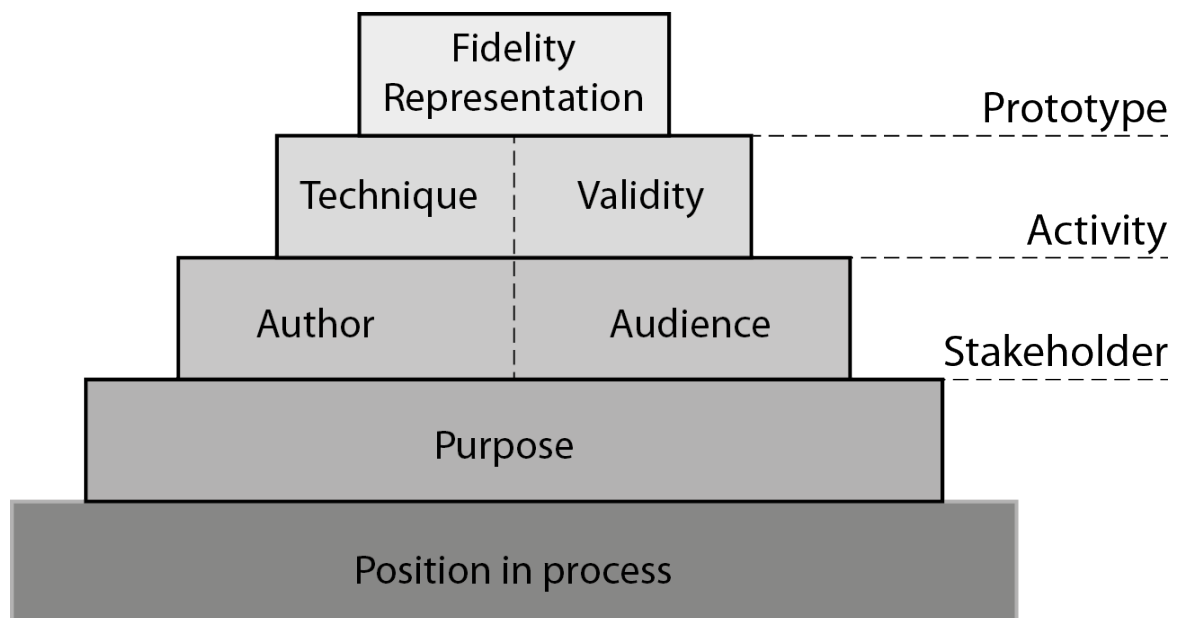


FIGURE 11: THE FINAL FRAMEWORK OF PERSPECTIVES ON PROTOTYPES AND PROTOTYPING.

Those parts of the framework, the prototype (fidelity and representation), the prototyping activity (technique) and the stakeholder viewpoints (audience) are all tightly connected and



governed by the purpose of prototyping. The purpose will affect what kind of feedback the audience is able to give, what technique to use and how to represent the idea, manifested as a prototype. The purpose affects all parts of the framework and influences the situation by pointing toward a goal that can be more or less well-defined (see also chapter 9.4).

What has been added in this version of the framework is validity and author. Validity is placed on the activity level, to represent the context in which the prototype is used or evaluated. The types of fidelity suggested by Wellings (2009) environmental and social fidelity, are relevant here and have to do directly with the validity of prototypes. When it comes to intervention fidelity, it has more to do with the actual prototype. Validity is closely related to technique and depends on what the prototype is and what category of service is being prototyped. Technique is a choice about how the prototype should be used, while validity on the other hand, has to do with how it should be tested and evaluated, on the other end of the scale. On the next level we find the author perspective, on the same level as the audience, which is the natural level to place it on. The author of the prototype influences what technique to use and how to represent the prototype. The author also has power to influence in what context the prototype should be tested or used, thus effecting the audience's perception of the prototype. This means that also the author and audience perspectives represent opposite sides of the same situation.

You could draw a line from the author perspective, via technique over to the prototype and then down on the right side, passing validity and ending up in the audience perspective. This would signify a logical way for decisions and choices in a prototyping phase. The author chooses, based on a purpose and a position in the process, what technique to utilise. This will also affect what the prototype should be made of and represent, and what degree(s) of fidelity the prototype constituents should have. Then the prototype should be tested in a situation that is valid for testing the perspectives that the audience is supposed to perceive, thus filtering the interesting parts of the prototype. A valid situation makes feedback from the audience, regardless of whether the audience is external or internal (the same as the authors), more reliable. All this, of course, happens at some point in the process and for a purpose, which influence choices at the other levels. In service design, the top level of the prototype might be represented only by people, doing things together. In other cases it can be represented by whole service systems, like buildings and servicescapes. In these instances, the activity is much more important than the actual representation. The process that will be suggested in a later section can be seen as a technique, and should thus be placed on the activity level.

### 9.1.3 Concluding remarks about the framework

The following discussion will summarise the findings about prototyping research and what it can contribute to the practice of prototyping in service design. The **representation** of a prototype is important for some service categories. It is especially important for services that

rely to a large extent on physical or visual elements, such as servicescapes, but it is also a function of when prototyping occurs in the process. It is reasonable to assume that the representation is more refined and important in later parts of projects when the feedback should be about how the services should look and not as much about what it should be.

**Fidelity**, is also an aspect of the prototype. Service prototypes need to represent different levels simultaneously. The suggested types of fidelity (McCurdy et al., 2006) are good indicators and serve as starting points for reasoning about this issue for service design. McCurdy et al. suggested that level of “visual refinement, depth of functionality, breadth of functionality, level of interactivity, and depth of data model” (p. 1240) should be considered. However, this division is intended for interaction design and perhaps best suited for prototyping interfaces. The proposed distinction into environmental-, social-, and intervention fidelity made by Wellings (2009), might be more useful when choosing fidelity of service prototypes. As mentioned, environmental and social fidelity is actually related to validity more than fidelity, while intervention fidelity can be interpreted more as how the prototype is represented and at which fidelities.

The fidelity both influence, and is influenced by, what **technique** is used. In service design, a combination of techniques and approaches should probably be used at different positions in the process. Many different techniques that can be suitable have been mentioned, both in Study 2 and Study 3, and a new process will be suggested at the end of this chapter. Many of the more recent techniques for prototyping, such as experience prototyping and role playing can be used in combination, as well as promising approaches to prototyping social interactions and services. The **validity** or authenticity is relevant both for how and where to use the prototype. Is the evaluation context similar to the intended context? How will that affect the experience? Who takes part in the evaluation and co-creation of the service? And the final question related to validity, which we will get back to, is if the prototype manages to capture a truthful representation of the holistic service experience.

The **audience** of service prototypes is many times the client of the design agencies. In prototyping literature there is a close connection between fidelity and audience. The idea is that the fidelity should be adjusted so that the audience can understand and comment on the design in a meaningful way. This is important for collaboration and the audience perspective is at least as important for service design as for other design disciplines. Considering who **authors** prototypes in service design can help make power relations and objectives for inclusion visible. If only one stakeholder decides what should be tested, as it usually is, then that stakeholder has all the power and influence over where the process is going. That stakeholder, often the designers, also decides what makes a prototype a success or failure. In that sense, it is strange that the issue of authorship of prototypes have not been raised previously. Including more people in the prototyping process, at least in the early stages of service design is also more feasible because services are about people and to make a prototype

of a service, at least in theory, you don't have to be a designer and you don't need to know how to use specific visualisation tools or techniques. Prototyping with external stakeholders might also be helpful in the sense that employees are trained by taking part in the co-production of a prototype service, making implementation of the service more seamless and smooth.

The **purposes**, as mentioned earlier, are to explore, evaluate, or communicate. These purposes are mutually exclusive in the sense that focus must be on one of the three. Explorative prototypes are flexible and can include some evaluation, and probably will, but mainly focus on generating ideas or insights. Evaluative prototypes are also open for new ideas but mainly look to confirm hypotheses. Communication prototypes are more refined and glossy, and evaluation of communication prototypes is not based on interaction with the prototype but rather a presentation or visualisation of the main ingredients of the service experience. When it comes to communication prototypes, paying attention to the audience is of great importance if the designer wants the message to be understood. And finally, the **position in process**, i.e. when the prototype comes in during a project, is also connected to the purpose of the prototype. Generally it can be assumed that the hypothesis is less well-defined early on in project and then gets more and more elaborate as the project moves along. This means that explorative prototypes are more common in the beginning of projects, and evaluative prototypes are more common in later stages. When it comes to the evaluation of prototypes, a well-defined hypothesis can be used to decide what the criteria for success are (see Study 5).

## 9.2 What is service prototyping?

The second research question was *What is service prototyping according to practitioners?* In detail the question also concerned the definitions of prototyping, the purpose, challenges, approaches, and how stakeholders are included in the prototyping process. The question of what service prototyping is cannot be answered without underlining the diversity and heterogeneity of the term "practitioners". There are many different kinds of service design practitioners. Looking at Table 1 (chapter 3.2), showing information about the informants, it is obvious that their **definitions** and perspectives on prototyping are different. They have different backgrounds and professional histories that affect their approach to designing services. None of them are trained specifically as service designers. This is one of the reasons why the activity of service prototyping cannot be said to be one thing, but rather a multitude of approaches and activities. It was concluded in Study 2 that, to practitioners, service prototyping is:

1. central to their work (but not a structured unit of their processes),
2. about making services visible, to learn and communicate about services and
3. collaborative.

This is the closest to a description of service prototyping we can come based on the studies in this thesis. The **purposes** of prototyping can be summarised as exploring, evaluating, and

communicating. This means that we might need to think of prototyping in different ways depending on whether the hypothesis behind the prototype is more or less well developed. The difference between prototyping activities to explore and evaluate can be said to be that exploring prototypes generate ideas and insights and more often can be thrown away after being used, while evaluative prototypes are made to test hypotheses and can be further developed into a final suggestion or solution. Communication prototypes can mainly be seen as arguments or stories that visualise ideas and facilitate collaboration within or between stakeholder groups. As mentioned earlier, the purpose of the prototype has ramifications for most other decisions about what and how to prototype.

The **challenges** that the informants mentioned with prototyping services as opposed to products (in Study 2) were: inconsistency, authenticity, validity, intangibility and time. The challenge of *inconsistency* relates to the nature of services as dynamic and changing, meaning that services are delivered a little different each time. The problem of *authenticity* concerns who is involved in prototyping. Real people and techniques that are realistic should be used; otherwise prototyping can generate false or uninteresting data according to the interviewed service designers. The *validity* is a closely related challenge associated with the authenticity of the test situation, compared to the intended implementation context. The problem of prototyping the *intangible*, such as experiences and social interactions, is also an issue. *Time* finally, relates to the issue of progression in services. Understanding and prototyping a material that changes based on the actions and interactions of people is a challenge.

Inconsistency and intangibility are recurring issues in the service management and marketing fields. The exceptions are authenticity, validity, and time, which are specific for the designers that were interviewed. There was not much evidence of a holistic **approach** to prototyping services. One informant accounted for a process that attempted to make holistic representations of services. The others did not, though most of them recognised the value of holistic service prototyping. There may be many different reasons why this is not feasible for most of the designers. One may be the clients' expectations, partly associated with the backgrounds of the designers and partly due to the fact that clients sometimes don't understand the different steps of the design process. If the clients don't understand the design process and what it means to commit to a service design approach the result might be that the designers have to limit their project scope or take away some parts that are too costly or time consuming in the eyes of the clients. Another explanation that interplay might be that there is not yet a widely spread and used process for approaching service prototyping, and most designers therefore stick to what they know from more traditional design disciplines.

### 9.2.1 Inclusion in service prototyping

It was interesting to see that the designers have the intention to include different stakeholders to such a large extent, when they did not account for many techniques or approaches that facilitate such activities in Study 3. Once again a plausible explanation, that finds some

support in the interviews, is that the expectations of the clients make truly collaborative approaches impossible. Another part of the explanation is the economic reality where most projects have budgets that don't allow for the coordination and inclusion of many different stakeholders. Activities in the design process that include different stakeholder groups are instead carried out in short and condensed workshops.

The interviews indicated more of a “subject view” of participants than a “partner view”. This view can be somewhat more nuanced though, by looking at who is involved in what way. We found that mainly the client was mentioned as a partner but that the end-customer generally was mentioned in terms of a subject. This seems quite intuitive, since the design of services involves designing both for customers and service providers, where the latter is paying for the work. This focus on the client may be unfortunate since there are a lot of stakeholders that need to be able to take part in, evaluate, and understand the design process. Customers are important to include, as in other design disciplines. The processes and outputs of design, many times concern a lot more people than just the most obvious ones such as clients and end-customers. It might be important for how the service is co-produced if also remote stakeholders are given the possibility to influence how services are developed and tested.

### 9.3 Service experiences in design communication

The third research question was *How are prototypical experiences incorporated in design communication?* In Study 4 we found a structure for how previous service experiences were incorporated in design communication. There were three different aspects of the experiences that the contributions focused on; behaviours, tangibles, and gathered data. This is not a list of the constituent parts of service experiences, but it says something about how we refer to previous service experiences when we try to coordinate and explain to others what the experience was like. Behaviours and tangibles are a little easier to understand using this line of thought, than gathered data. Gathered data is however the same thing as an expert or a third party in this situation. What the data says comes directly from the users; it is the voice of the users. The exemplars were introduced using a specific structure:

1. Introduction of the exemplar
2. Description of the surrounding context or behaviour
3. Implicit or explicit referral to expected associated emotional response

The fact that an expected emotional response is added indicates that this is meant as an argument for some opinion. What is interesting for service prototyping is that this tells us 1) how people deal with situations when there is no prototype available to talk about and 2) how suggestions for improvements or adjustments to prototypes can be made by stakeholders collaborating in design projects. It also underlines the importance of having a good set of (collective) service exemplars that help teams coordinate their activities and understand each other.

## 9.4 Evaluating service prototypes

The fourth question was *How can service prototypes be evaluated?* One answer to that question is; by using the designers' hypothesis. The process described in Study 5 includes building up a hypothesis structure, formulating questions, and making a questionnaire. The most interesting part is how to make the hypothesis explicit, which in the suggested process is done by going through the steps; extracting the emotional keywords, finding bridges, and organizing themes. The main finding of Study 5 was perhaps that the hypothesis was so vague before the process started. The evaluation was supposed to be measured against the ambivalent goal of whether it "improved the waiting room." This is however a very subjective assessment and difficult to use in communication with the client and could also be the result of a number of things unrelated to the prototype or related to a specific part of the prototype that is not included in the final version.

The value of each part of an evaluative service prototype, and its influence on certain, testable, aspects should be made clear before the prototype is evaluated. If different stakeholders have been included in the process they can more easily take part in and understand the prototype and whether improvements have been made. This process can be further facilitated by the suggested prototyping framework, not the least when it comes to the purpose for prototyping services. Thinking about the prototype and activities around it from the perspective of the suggested prototyping framework makes relevant aspects explicit and available for investigation. The process suggested in Study 5 also has implications for the authors of prototypes; it can help verbalise the purpose of prototypes and facilitate communication within and across actors in the design team. The process is also relevant for the validity of prototypes, since the tool is developed in a contextual and situated way that helps designers identify aspects of the implementation situation that is relevant for the prototype.

## 9.5 A proposed service prototyping process

The fifth and final question was *How can research improve service prototyping?* There are many ways to answer this question, since adding additional knowledge can actually be interpreted as an improvement. Adding more knowledge and using a descriptive approach has been the dominating contribution of this thesis so far. Such contributions however, have a hard time of reaching the practicing community. This thesis should also contribute with some more practical and useful suggestions for how to improve service prototyping. This is why this chapter is concluded with a suggestion of a prototyping process that is specific for service design. Except for the suggested process, the thesis has also contributed a process for generating an evaluation tool and a way to categorise services. The categorisation scheme suggested in the Method chapter (3.5.1) should be tested and verified so that more can be learned about how to categorise services in a way that will help service design practitioners talk and think about services. The categorisation should also affect the approaches and techniques that service designers use. If proven useful, the relationship between service

providers and their customers should be possible to derive to some extent from the service category, which should make competitors and good solutions within similar categories easier to find.

So far, the answers to the research questions have perhaps only lead to more questions about how to represent holistic service experiences, since there has been so little evidence for approaches that deal with this issue. The process that will be presented here is based on the research made in this thesis and connects back to previous research about service design practice. Most importantly it suggests a way to approach representation of services in a holistic manner. By doing so, it also addresses the challenge of validity in service prototyping; using a more holistic approach to prototyping services arguably captures more of the entire service experience. Also, if the prototype is evaluated in the intended context, the prototype gains additional credibility in regard to validity.

The process is mainly intended for evaluative prototyping, where the process is somewhat traditional in the sense that there has been a research phase and a conceptualisation phase before prototyping begins. Both explorative and communicative prototyping have specific circumstances that are not addressed by this process. In essence, prototyping in this case means that the prototype is grounded in research and not part of an initial exploration or communication phase of a project. The intention was to generate a tentative suggestion for a service prototyping process, based on the interviews, the literature study, and both formal (presentations etc.) and informal discussions with colleagues and service design practitioners. The aim is to have a process that is tailored for service design. An outline of the process will be presented here.

The process takes an existing visualisation of a service as a starting point for creating an understanding of which parts should be designed or redesigned. This understanding of the service and the people in it is the basis for defining a goal of what the service should do and how it should do it. Then, the necessary parts of the service are designed in a quick and easy way. This means designing things like reading matters that summarise the service, a mock-up of a web page where the service can be signed up for, a script for how to deal with complaints, and things like that. These parts are then tested together, holistically as a service, using real people that give their input on the experience. Based on the input, changes are made to the prototype so that the service gets closer to the predefined goal. The process is summarised here and then discussed in more detail.

1. Look at the service as a whole and in detail
2. Decide what can/should be designed/redesigned
3. Define the goal
4. Design the necessary parts
5. Evaluate the whole service
6. Iterate

The steps will now be further discussed.

- **Look at the service as a whole and in detail**

To generate a process that is specific for service prototyping, the process starts with some kind of visualisation of the service. The kind of visualisation implied here is a representation of an existing service, visualising data from the research phase of service design projects. Previous research has shown that user research data is visualised (Segelström, 2010) and looked at both holistically and in detail (Kimbell, 2008).

Visualising the service facilitates both collaboration within design teams and the ability for designers to include external stakeholders in the process. A visualisation can also help define the goal and make the empathy for end-customers and other co-producers of services available throughout the design process. Visualising a service might not be possible if a new service is being developed from scratch. In that case, the visualisation might be a storyboard or scenario outlining the new service and its moments and touchpoints. Such visualisations are also, in a sense, prototypes since they describe a future and how behaviour will change with the new service. The important thing here is that the service is represented in its entirety so that designers can zoom in and out to think about what happens in detail and how that relates to the bigger picture of the service proposition.

- **Decide what can/should be designed/redesigned**

Based on an understanding of either an existing service or a new service, critical points should be identified. These points should be critical in the sense that they are decisive for the experience of the service and deemed as important for one or more stakeholders. If design research indicates that there is something problematic with an existing touchpoint or sequence, they should be redesigned. New ideas might also lead to completely new service moments that can be added to complement or replace existing moments. These choices have many times been motivated solely by economic drivers, but when viewed holistically and from a people perspective, alternative solutions may be the result. The visualisation of the service helps in identifying how the service should be changed. It might be possible to delete a number of different touchpoints by adding a web site that allows many of the same actions. It might however not be the most appreciated mode of interaction from the customer's or the front line staff's points of view. A service prototyping approach should take those kinds of deliberations into account. It can also be helpful at this stage to think about what kind of service it is and what category it belongs to. This helps identify what to include in the service, the relationship between the service provider and other costumers, and the approaches and techniques that might be suitable.



- **Define the goal**

Depending on the position in the process, the possibility to have a clear goal or assumption about how the behaviour will change with the new prototype varies. When the purpose is to do evaluative prototyping at least some kind of goal must exist that the observed behaviour can be matched against. This is why it is important in this process that some time is spent on thinking about what kind of situation the prototypes should lead to and how that should then be interpreted. The assumption should also contain an idea about what the parts of the service are and what the prototype needs to represent. This step should challenge vague assumptions and make implicit ideas more explicit to open up for collaboration and inclusion, while at the same time making the evaluation of the prototype easier.

- **Design the necessary parts**

The prototype will probably consist of many types of designed materials and interactions. It can be anything from face-to-face interactions, behaviours, and scripts to signs, colours, interfaces, furniture, sound, smell, and so on. The representation of the service should include the whole service, or as much as possible, to capture the experience in a truthful way. This does not mean that everything should be built from scratch. If the aim is to redesign a service, the existing service system can be used to make more accurate assumptions about how well the prototype achieves its goal, by evaluating the prototype in that context. This is many times not feasible because the prototype might interfere with the service. In those instances it is better to make representations of the most important parts; the ones that convey the main points of the service. Designing them means thinking about a lot of different aspects. Here, the framework of prototyping perspectives should be used to think about what the prototype should look like, its fidelity and representation, what the content should be, who the audience is and so on.

- **Evaluate the whole service**

Making the evaluation meaningful for service prototypes is achieved by using authentic people and real situations. The validity of the test environment can be controlled if the service already exists, by evaluating the prototype in the existing service system. To be able to understand the whole service experience it is important that all of the parts of the service are tested together. Evaluating the service from start to finish makes it possible to test the progression and relationship between different touchpoints. This is a way of dealing with the challenge of time, suggested by the interviewed service design practitioners. Services are sometimes spread over large geographical areas and won't be possible to test holistically, or the service does not yet exist. In those cases the prototype can be tested in other locations using whatever props and material is available there. If there is some step that does not work or if it is difficult to understand, or simply doesn't live up to the assumptions behind the prototype, quick alterations should be made to the prototype before the next iteration.

- **Iterate**

Unless the prototype is only meant to generate knowledge, iterations are important to deal with the feedback from each prototype version. The prototype should optimally be lightweight enough to be changed from one day to the next. This is of course not feasible for all types of prototypes but nevertheless desirable. The process can come in after user research is finished or earlier, in the beginning of projects if they are prototype driven. For evaluation prototypes that are supposed to gradually replace the existing service or touchpoint, the prototype can be part of a later stage or implementation and fine-tuning.

The position in the process will affect how and what the prototype is. In relation to other design disciplines, a service prototype can generate input for interaction design, for instance by providing scenarios that are tested, or even more detailed suggestions for user interface sketches or wireframes. It can also run simultaneously as graphic design and partially industrial design. Most of the time, more specialists are needed to make that work since there is so much to design. At the same time, it is better to get down to the question of visual appearance and context while prototyping since that will make the situation more valid. Generating an appealing expression of the service, after the prototype is finished, disregards the connection between visual and functional aspects.

This process is believed to enhance service prototyping and deal with some of the problematic issues highlighted by service design literature and practitioners. It can generate a more realistic representation of a complete service experience. Real people in real situations make more valid predictions possible but the main factor that influence how the prototype is represented and evaluated is whether it is a new service or already existing service. By using holistic representations on the prototype level, iterating on the activity level, and real people on the stakeholder level, the challenge of inconsistency suggested in Study 2, can be tackled. The process will need to be tested and verified empirically.

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## 10 Future research

Since the research in this thesis is largely based on interviews, more research about prototyping based on observations is a good complementary next step. Observations of service prototyping, and service design at large, need to respect the fact that there are many different approaches and cultures of designing services. An approach based on observations and participation could also reveal interesting knowledge about how the different backgrounds of designers affect their work and approach to service design. Also, which perspectives they have and the way they use previous experiences to improve their work would be interesting research topics. Building on that, it should also be fruitful to see what happens with exemplars of previous experiences in design communication, to find out how they are different from other types of arguments and contributions, and if so, in what way they are different and what happens after they have been used. This could reveal if actual experiences are more important for the end result than other types of references or arguments.

More research could be done on categorising services in a way that is meaningful for design. What are the existing categories and how can they be used in design? What are the associated and preferable prototyping approaches for each category? Can the purposes explore, evaluate, and communicate be used as a starting point or are they better suited as frameworks for how to prototype in existing service categories? Another look at fidelity of service prototypes can also be worthwhile. How can the concept of fidelity in service representations be used, if at all? What are the kinds of fidelity and in what way are those different kinds helpful for designers that want to prototype a service? What is the relationship between fidelity in services and the different stakeholders? How can inclusion in design influence fidelity and are there similar connections between fidelity and audience as in other design disciplines?

More research about how to make holistic representations of services that allow testing and evaluation of the service experience is needed. Finally, also the suggested prototyping process should be tested empirically to find out what the benefits may be and how it can be improved. Variations of the approach that can be tested include:

- Contextual vs. laboratory
- New services vs. existing services
- Service moments vs. service journeys

What are the actual benefits of contextual prototyping and what are the differences from laboratory test environments, or controlled environments, in regard to cost, completeness, and transferability? How well do the process work for new services compared to when existing services are being developed? And how important is it to represent services holistically? Is it enough to just focus on single service moments or touchpoints?

## 11 Conclusions

The identified framework in Study 1 consists of the following perspectives from which prototyping have been discussed in previous literature; purpose, fidelity, audience, position in process, technique, and representation. This framework was compared to common descriptions of services and other studies showing how service designers work. Based on that comparison, attention was directed at the interviews to see how the data compared to the reported practices of service prototyping. This resulted in an expansion of the framework where the perspectives of author and validity were added as complements to the existing perspectives. The framework can be used by service design practitioners to reason about their prototypes and verbalise knowledge about how to prototype services. It can also be used in teaching service design to highlight interesting perspectives, compare it to existing or developing prototypes, and problematize areas where prototyping should be improved or complemented.

Apart from showing the general attitudes and reported practice of service prototyping, the data from Study 2 has also revealed how different stakeholders are involved in service prototyping and what the main challenges for service prototyping are. The identified challenges with prototyping services as opposed to products were identified as: inconsistency, authenticity, validity, intangibility and time. These challenges have been held up and discussed in various parts of the thesis. Intangibility has been discussed in relation to techniques that deal with experiences and processes in various ways. Time has partially been addressed by techniques, and partially by a suggested service prototyping process. Techniques that allow designers to explore and simulate experiences and other intangible aspects, and that can help understand how the experience changes over time, are important for service prototyping.

At the moment, service prototyping cannot be said to be one thing but rather a variety of approaches and activities. Despite this, some commonalities could be found indicating that service designers find prototyping to be; central to their work (but not a structured unit of their processes), collaborative, about making services visible, and to learn about and communicate service concept suggestions. Study 3 revealed a slight mismatch between the objectives of service designers and the actual reported practices. Many times, the client was the most involved stakeholder and not often as an equal to the designers but rather as a subject or passive informant. More interestingly, the interviews did not show much in the line of holistic prototyping approaches but rather prototypes of single elements of services.

A structure of how previous service experiences are introduced in design communication was found in Study 4. This study also highlighted the importance of cultural common ground and common reference points for collaboration and coordination of activities in the design process. Study 5 indicated that measuring the change in customer experiences as a result of changes to the physical surroundings in the emergency ward was difficult. The original assumptions the designers made were difficult to verify but the process helped the designers make their assumptions explicit and revealed a limited structure of the hypothesis behind the prototype. The way that the designers reasoned about research data and how they decided on what to change and implications for the experience provided important insights.

This thesis has also contributed a suggestion for how to approach holistic service prototyping. This is done by going through a process that deals with some of the service specific attributes. The steps in the process are;

1. Look at the service as a whole and in detail
2. Decide what can/should be designed/redesigned
3. Define the goal
4. Design the necessary parts
5. Evaluate the whole service
6. Iterate

The process can prove useful if the scope is not too hard to deal with, i.e. if the whole service can be represented and the stakeholders are willing to take part in the prototyping activities. The process needs to be tested and verified. As a conclusion it can be said that service prototyping is still in its infancy. A lot of knowledge in this area will be generated in the coming years, hopefully as a result of multi-disciplinary approaches and with contributions from many different fields that overlap in the interest of service design.



# 12 Appendices

The appendices for the studies are located here.

## 12.1 Appendix A

The Self-Assessment Manikin (SAM). This is the scale and picture that was used in Study 5. It was located on the back side of the questionnaire (Appendix B). The text is in Swedish.

Vi är intresserade av hur du känner dig när du vistas i akutmottagningens lokal. Markera med kryss vilken figur som stämmer bäst överens med din upplevelse.

Olycklig/ Ledsen										Lycklig/ Glad
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Lugn/ Uttråkad										Upphetsad/ Delaktig
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Kontrollerad av										I kontroll
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

## 12.2 Appendix B

The Questionnaire developed in Study 5. The page was a full A4 and had a back-side as well. The text is in Swedish.

Hej!

Vi samlar in data om hur vuxenakutens mottagningsrum upplevs, som en del av ett större forskningsprojekt om förbättringsarbete i vården. För att skapa en bild av hur situationen ser ut idag behöver vi din hjälp. Vi skulle därför bli väldigt tacksamma om du kunde svara på några frågor om just din upplevelse.

Enkäten består av **två sidor** och tar någon minut att fylla i. Enkäten är indelad i tre delar, varav endast patienter svarar på sista delen.

**Deltagandet är anonymt.**

Patient  Anhörig

Hur länge har du väntat? .....

Har du varit här förut? ja  nej

Om ja, för hur länge sedan? .....

### Del 1.

Markera med kryss det alternativ som stämmer bäst överens med din upplevelse

	Håller inte alls med		Håller fullständigt med		
Det är tydligt anvisat hur man ska göra för att få rätt kölapp	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det stör inte personalen om jag frågar dem om något	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det är svårt att veta hur man ska bete sig när man först kommer in i lokalen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det känns inte rätt att störa personalen med frågor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jag har god uppfattning om hur länge jag kommer behöva vänta	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det framgår klart vart man ska gå när man kommer in i lokalen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det är oklart vilken min plats i kön är	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Det är svårt att se vart man ska vända sig beroende på ärende.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Vänd!**



## 12.3 Appendix C

Interview guide. This guide was used during the interviews. Follow-up questions were asked when appropriate and the analysis in Study 2 and 3 has focused on specific questions or areas.

-----

This interview is part of the research for my PhD project conducted at LiU, Sweden. The goal of the research in this project is to understand the potential and the actual use of different tools and techniques in service design practice.

The collected data will be made anonymous and will only be used for my research. If I decide to publish any names I will ask your permission beforehand. You can stop the interview at any time and of course, you don't have to answer any questions if you don't want to. Do you have any questions?

To be able to place the interviews in a professional context, I'd like to know more about your professional background; where and what did you study, what has your work life looked like and so on?

A colleague of mine conducted interviews about user data collection and this interview builds upon his research. My aim is to find out what happens after the user data has been collected and what tools you use later on.

This interview is divided into four parts. The first one is called idea generation, but we start with a more general overview of how you work.

-----

### 1. IDEA GENERATION

*In a typical project, after the data collection and research is finished, you probably have a lot of data that you want to translate into ideas and concepts. Could you talk about how that is done and where you usually go from there?*

What design tools, such as scenarios, personas and so on, do you use after user data has been collected in a typical project?

At what point in an average project do you start generating and collecting ideas?

When do you start making models, visualisations or sketches of ideas?

### 2. PRODUCTION

Would you say that prototyping is an important part of your work?

How much time (relatively) do you use for prototyping, and do you feel that it is enough, too much or too little?

Can you talk a little about how you actually make prototypes?

Do you prototype mainly physical things or do you think more about social interactions?

## APPENDIX

Do you use any kind of roleplaying?

Do you prototype whole services or focus on single encounters most?

Is there any kind of prototyping technique or method you still haven't tried but you think would work?

Does it matter at what time, and in what order, prototyping comes in during a project?

Who is involved in creating the prototypes? Clients, stakeholders, designers, specialists?

Previous research shows that a lot of user data is visualised with different methods such as blueprints and customer journeys. Do you work specifically with such methods to prototype also?

How do you make sure that prototypes connect back to the gathered user data? Relevance.

How is prototyping different depending on client and on who the intended audience is?

Are the prototypes you use internally, within the company, different than when you are working with a client?

Does it matter if the client is a public organisation, non-profit, or commercial.

### 3. EVALUATION

Do you use formal evaluation methods to test your prototypes? Which ones?

Who evaluates the prototypes? The ones who make the prototype?

Are the clients involved?

Is it more important to prototype in some cases than others? If so, when?

What is the goal of prototyping?

### 4. SERVICES

Have you encountered any problems with prototyping services or felt that some knowledge or tool is missing to make good service prototypes?

Do you see any specific challenges with prototyping services as opposed to products?

-

In your opinion, what are you designing?

What is a service according to you?

What is a service prototype to you?

What is service design according to you?



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Division, department

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Department of Computer  
and Information Science

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Date

2011-05-10

**Språk**

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Conceptualising Prototypes in Service Design

**Författare**

Johan Blomkvist

**Sammanfattning**

To date, service prototyping has been discussed academically as an unproblematic add-on to existing prototyping techniques, or as methods for prototyping social interaction. In fact, most of the knowledge on how services are prototyped comes from organisations and practicing design consultants. Some attempts to define service prototyping have been made but generally without concern about how complete service experiences should or could be represented. Building on existing knowledge about prototyping, a draft of a service prototyping conceptualisation is generated. Based on the draft, the question of how to prototype holistic service experiences is raised and in total, 5 studies have been conducted that contribute knowledge to that overarching question. In addition, each study has its own research question. Study 1 conceptualises prototypes and prototyping in a framework while study 2 and 3 looks at what practicing service designers say they do to prototype services and how they involve different stakeholders in the process. Study 4 examines aspects of design communication and how service experiences are communicated and used during design meetings, and study 5 finally, attempts to generate a process that can be used to evaluate the impact of location oriented service prototypes in e.g. healthcare settings. A number of challenges for service prototyping are identified in the studies, along with the issue of who authors prototypes. The conceptualisation of prototyping is adjusted based on the studies and a framework is constructed that support the conceptualisation. Little evidence for holistic approaches to prototyping services is found in the interviews and service designers involve their clients primarily when prototyping. Service experiences are introduced in communication using a format termed micro-narratives. This format and the purpose of using references to previous experiences are discussed. The thesis is concluded with a suggestion of a process for service prototyping. This process is specific for service design and attempts to support service designers in making holistic service representations when prototyping. Service prototyping requires further research.

**Nyckelord**

Service design, Prototyping, Thesis, Service Prototyping,



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