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Visualisations in Service Design

by

Fabian Segelström

Submitted to Linköping Institute of Technology at Linköping University in partial
fulfilment of the requirements for the degree of Licentiate of Philosophy

Department of Computer and Information Science
Linköpings universitet
SE-581 83 Linköping, Sweden

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ABSTRACT

Service design is a relatively new field which has its roots in the design field, but utilises knowledge from other disciplines focusing on services as well. The service design field can be described as a maturing field. However, much which is considered knowledge in the field is still based on anecdotes rather than research. One such area is visualisations of insights gained throughout the service design process. The goal of this thesis is to provide a scientific base for discussions on visualisations by describing the current use of visualisations and exploring what visualisations communicate. This is done through two different studies.

The first study consists of a series of interviews with practicing service designers. The results show that all interviewees visualise their insights gained throughout the service design process. Further analysis found that there are three main lines of arguments used by the interviewees in regard to why they visualise; as a tool to find insights in the material, to keep empathy with users of the service and to communicate the insights to outside stakeholders.

The second study analysed six visualisation types from actual service design projects by service design consultancies. Four different frameworks were used to analyse what visualisations did, and did not, communicate. Two of the frameworks were based on research in service design; the three reasons to visualise as stated in the interviews in study 1 and a framework for service design visualisations. The two frameworks were adapted from other service disciplines; what differentiates services from goods (the IHIP-framework), and a framework focusing on service as the base for all transactions (Service Dominant Logic). It is found that the visualisation types in general are strong in communicating the design aspects of services, but that they have problems in representing all aspects of service as identified in the service literature.

The thesis provides an academic basis on the use of visualisations in service design. It is concluded that it seems like the service design community currently sees services as being not-goods, a line of thought other service disciplines have discarded the last ten years and replaced with a view of services as the basis for all transactions. The analysis highlights areas where there is a need to improve the visualisations to more accurately represent services.

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Department of Computer and Information Science
Linköpings universitet
SE-581 83 Linköping, Sweden

可视化有效地传达了服务的设计方面

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To use the terminology from the service blueprint (after all, research is a kind of public service) — I may be the one interacting with you, the reader, but I would not be able to do it without all the people in the back office, be they colleagues, friends or professional acquaintances. A warm thank you to...

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1. Introduction

Service design is a field which has gained traction during the 21st century. Its roots are in design, but knowledge is drawn from a number of other fields such as service management/marketing and anthropology. Service design can be described as the use of a designerly way of searching for solutions to problems in people-intensive service systems through the engagement of stakeholders. This definition presupposes knowledge of service theory as well as design practice however.

Service as a field of academic study emerged during the 1970s, although individuals had been interested in it since the 1950s. Early service research focused on why services were different than products, which lead to early frameworks of service aimed at describing the unique features of service. This initial view of services was predominant until the time around the millennium change, when leading authors started questioning this view. From the discussions criticising the view of services as something different than goods, a call for a paradigm change emerged. The new paradigm is referred to as Service Dominant Logic and it sees service provision rather than the selling of goods as the basis for economic exchange. Goods are in this view distribution mechanisms for services. Services are systems consisting of the goods and the people involved in it.

Design has a long history as a practice, but the roots of academic research in the field are often traced to the 1960s, when research started focusing on tools and techniques rather than on form (on which research had been done since, at least, the Bauhaus-era). Research on how designers work found that designers externalise and test hypotheses with sketches in the real world rather than testing solutions in their mind only (as

服务是由
货物和参
与其中的
人员组成
的系统。

cognitive theories would suggest). As the design practice has evolved, the concept of what possible objects there are to design has been expanded. Originally it only included decorative aspects, whereas large scale systems as well as decorative aspects are seen as design objects today.

以用户为中心的设计的有用描述

To be able to design objects which people want to use, the designers need to understand the end-users of the object they are designing. As the object of design has expanded, designers have increasingly encountered situations in which they lack previous knowledge. This led to the rise of user-centred design, which encourages designers to engage with the users they are designing for.

服务设计人员将设计实践和工具应用于服务开发。

It is from this design tradition service design has emerged, with inspiration from industrialised societies change towards service economies. Service designers bring with them the practices and tools of design and now apply them on the development of services. This new focus of design activities has led to the adaptation of existing tools as well as the development of new techniques.

产品可以很容易地代表。服务不能轻易代表。服务的表示称为可视化。

As services cannot be represented as easily as products due to consisting of a chain of actions, one area which has been in focus for the development of new techniques and adaptation of old ones is the representation of a service. These representations are known as visualisations. As service design still is a young field, much knowledge is based on anecdotic evidence rather than academic research.

The role of visualisations in service design is the focus of this thesis. The purpose of this thesis is to provide an academic basis for the study of visualisations in service design.

1.1. Thesis outline

This introduction chapter provides a short overview of the focus of design and introduces the overarching purpose of the thesis.

Chapter 2 provides the theoretical background to the study. The evolution of scientific research on services, design and service design is given. The last section of the chapter provides an overview of how visualisations have been discussed in service design literature previously.

Chapter 3 – Interlude – introduces and exemplifies six of the most popular visualisation techniques (chosen to correspond with the categories in the second study). The basic traits of the visualisations are described in connection with a short historical background. The textual description is accompanied with a graphic representation of each technique.

Chapter 4 contains an interview study. 14 interviews with practicing service designers were performed. The study aims at providing a description of how service designers use visualisations in their work process. The results of the study include a list of visualisation techniques used, an analysis of arguments for using visualisations and the identification of the standard visualisation techniques of service design. The discussion focuses on the role of visualisations as a supporting tool to understand user research and on the various communicative goals for using visualisations.

Chapter 5 reports on the second study of the thesis. This study consists of the analysis of 17 visualisations divided into six categories. The visualisations were analysed with four different frameworks, two from the design domain and two from the service domain. Traits traditionally in focus for design were better expressed by visualisations than those identified in service literature.

Chapter 6 contains the discussion chapter of the study. Results from the two studies are discussed and conclusions are drawn. Suggestions for future research studies are also made.

1.2. A note on terminology

The issue of what to call the recipients of the outcome of a service process is a difficult one when writing on service design. The service field mainly relates to the recipients of the outcome of a service process as customers (consumers and users are used by a small number of authors), whereas the design field primarily refers to the people they design for as users. This thesis uses the convention of the perspective in focus, which means that customer is used in a service context and user in a design context. The two terms should be understood as interchangeable and referring to the recipient of the outcome of a service process.

As most fields, service design has its own terminology. When concepts with a specific meaning are used for the first time in this thesis, they are explained in a footnote. The aim, however, has been to use as few as possible of these terms. In this context it is clarified that the term visualisation is always meant to be understood in the service design context (in contrast to visualisations of large amounts of quantitative data as in Edward Tufte's and Hans Rosling's senses of the word).

1.3. List of publications

Parts of the material in this thesis have previously been presented in the following publications:

Introduction

- Segelström, F. (2009). Communicating through Visualizations: Service Designers on Visualizing User Research. *First Nordic Conference on Service Design and Service Innovation*. Oslo, Norway.
- Segelström, F., & Holmlid, S. (2009). Visualization as tools for research: Service designers on visualizations. *NorDes 2009 – Engaging artifacts, Nordic Design Research Conference*. Oslo.
- Segelström, F., Blomkvist, J., & Holmlid, S. (2010). Visualizations of Qualitative Research Material: Insights from the Service Design Community. *Proceedings of 19th Annual Frontiers in Service Conference*, (p. 163). Karlstad, Sweden.
- Blomkvist, J., Holmlid, S., & Segelström, F. (forthcoming). This is Service Design Research. In M. Stickdorn, & J. Schneider (Eds.), *This is Service Design Thinking*. Amsterdam, Netherlands: BIS Publishers.
- Segelström, F., Raijmakers, B., & Holmlid, S. (2009). Thinking and Doing Ethnography in Service Design. *Proceedings of the International Association of Societies of Design Research, IASDR 2009*. Seoul.
- Wreiner, T., Mårtensson, I., Arnell, O., Gonzalez, N., Holmlid, S., & Segelström, F. (2009). Exploring Service Blueprints for Multiple Actors: A Case Study of Car Parking Services. *First Nordic Conference on Service Design and Service Innovation*. Oslo, Norway.

2. Theoretical background

The aim of this chapter is to put the field of service design in its historical context, and frame the research presented in this thesis within the service design community. This is done by describing the two scientific communities which have primarily been a basis for the field; service research and design research. It is then shown how service design has been influenced by the two fields, and how service design has evolved. Han (2010) presents a similar distinction, but focuses on definitions of service, design and service design, rather than the evolution of them. Finally, the specific topic of visualisations is presented.

2.1. Services

“The labour of some of the most respectable orders in the society is... unproductive of any value, and does not fix or realize itself in any permanent subject, or vendible commodity, which endures after that labour is past, and for which an equal quantity of labour afterwards be procured. ... Their service, how honourable, how useful, or how necessary soever, produces nothing for which an equal quantity of service can afterwards be procured.”
(Smith, 1776/1835, p. 356)

The quote above is from “The Wealth of Nations” by Adam Smith, and variations of it have often been used to highlight the origins of the (perceived) traditional product focus of economic theory in Smith’s seminal work (e.g. Lovelock & Gummesson (2004); Vargo & Lusch (2008b)). Smith’s argument was that those who engage in service produce value for the moment but that the economic gain from which a

Theoretical background

nation's wealth can be built comes from produce and the refinement of raw material. Products can be produced in advance and stored until consumption whereas services cannot be produced in advance. Smith uses the military as an example of his thoughts; they are crucial for the nation, but the fact that they can defend the country this year will not lead to that it is defended next year. According to Smith's thinking only those who produce products do productive work – those who deliver services do unproductive work.

This line of thinking went unchallenged for almost two centuries, leading services to be seen as inferior to products. The first attempts at working with service specifically came from a growing insight that services might be different from products/goods, leading up to that the question “Are goods and services different?” was first put forward by (Johnson, 1969, cited in Brown, Fisk, & Bitner (1994)). Two companion articles were published in the early 1990s which described the growth of the services marketing field up until that point; Brown, Fisk, & Bitner (1994) describe three stages in the development of service marketing whereas Berry & Parasuraman (1993) describe the evolution based on different key players. The three stages described by Brown, Fisk, & Bitner (1994) are:

1. *Crawling out*: This period focused on establishing the field in contrast to the existing fields and defining services; “virtually all services marketing authors during the 1970s felt compelled to argue that services marketing was different, at least in the introductions to their articles and papers” (Brown, Fisk, & Bitner, 1994, p. 26). One of the most influential papers in this period came from the (then) Citibank VP Lynn Shostack (1977), criticising the marketing sector for its focus on products.
2. *Scurrying about*: A period in which there was high interest in the field and the first conferences, aimed specifically at those in the field, were created. The content of publications drifted from arguing for services marketing as a field to more investigative studies on various aspects of service marketing.
3. *Walking erect*: This phase corresponds to services marketing being a fully accepted discipline in its own right. It represents a time when research focus on specific aspects such as new service development and quality management as well as reaching out towards other academic disciplines.

As said, the early research on services focused to a large extent on how services are different from goods. Already in the Crawling out-stage, this developed into a theoretical basis for most of the work done within services marketing in the 20th century (Brown, Fisk, & Bitner, 1994):

“Perhaps the major outcome of the Crawling Out stage is the literature’s delineation of services characteristics. These features – intangibility, inseparability, heterogeneity, and perishability – provided the underpinnings for the case that services marketing is a field distinct from goods marketing.”

(Brown, Fisk, & Bitner, 1994, p. 26)

However, the four characteristics - intangibility, inseparability, heterogeneity, and perishability – were not consistently used until Zeithaml, Parasuraman, & Leonard (1985) published a literature review towards the end of the *Scurrying about* period. Zeithaml, Parasuraman, & Leonard (1985) reviewed 46 publications from 1963-1983 in regard to how they define services as different from goods. After having sorted the papers into 26 piles so that each author only represented one data point, without consideration of the number of publications they found the four characteristics to have been mentioned between 10 and 26 times by the original authors:

- » Intangibility: 26/26
- » Inseparability: 23/26
- » Heterogeneity: 17/26
- » Perishability: 10/26

Although only listed in the order intangibility, heterogeneity, inseparability and perishability once throughout the Zeithaml, Parasuraman, & Leonard (1985)-paper this order has become the de facto-standard and the characteristics have become known as IHIP. The four characteristics can be described as follows (based on Zeithaml, Parasuraman, & Leonard (1985) and Lovelock & Gummesson (2004)):

Intangibility: The intangibility of services only refers to that services cannot be touched. In the words of Zeithaml, Parasuraman, & Leonard (1985, p. 33): “Because services are performances, rather than objects, they cannot be seen, felt, tasted, or touched in the same manner in which goods can be sensed.”

Heterogeneity: Services are delivered by different individuals whose temporary mood fluctuates over time, which leads to the fact that the outcome of a service procedure cannot be standardized in the same way as goods production can be. This leads to further complications when a customer is involved in the process, a customer which is different in engagement, attitude and so on from the previous and next customer. As the term heterogeneity isn’t self-evident, it is at times referred to under other names such as non-standardization, variability and inconsistency.

Inseparability: This characteristic relates back to the Smith-quote above; the production of services is inseparable from the consumption thereof. Matter of fact, Zeithaml, Parasuraman, & Leonard (1985) did use the longer label “inseparability of

Theoretical background

production and consumption”. This also highlights that customers of a service also are co-creators of the service (to use the phrase popularized by Vargo & Lusch (2008a)).

Perishability: This is an extension of the inseparability claim, which focuses on the stability of a service rather than the customer’s role in the production. A service cannot be pre-produced and saved for later use – the Smith military example serves as a good example here. It also highlights the need to have the right amount of resources available at any given point: “If demand is low, unused capacity is wasted. If demand exceeds capacity, it goes unfulfilled and business may be lost” (Lovelock & Gummesson, 2004, p. 29).

The notion of IHIP as the characterisation of services lived on for about 20 years after Zeithaml, Parasuraman, & Leonard (1985) first published their literature review. However, a few years into the 21st century this view was scrutinized by many authors, some of the most influential publications being Vargo & Lusch (2004; 2008a), Lovelock & Gummesson (2004) and Edvardsson, Gustafsson, & Roos (2005). Lovelock & Gummesson (2004) analysed the four IHIP-characteristics thoroughly and found that no characteristic held for all service categories. Thus what had been claimed as the characteristics of service are not universal characteristics of specific services. Similarly, Edvardsson, Gustafsson, & Roos (2005) found the characteristics to be outdated. They suggest that services should not be seen as different from goods, but rather as a “perspective on value creation and that value creation is best understood from the lens of the customer based on value in use” (Edvardsson, Gustafsson, & Roos, 2005, p. 107).

Vargo & Lusch challenged the traditional service-view even further in a series of papers which have had an immense impact on the services management-field (Vargo & Lusch, 2004; 2008a; 2008b). Rather than calling for new ways of describing services, they argue for a new dominant logic within marketing, in which services take the centre-stage; “the new perspectives are converging to form a new dominant logic for marketing, one in which service provision rather than goods is fundamental to economic exchange” (Vargo & Lusch, 2004, p. 1). This thought has become known as service-dominant logic (short form: S-D logic). They presented 8 foundational premises for this new dominant logic (Vargo & Lusch, 2004), which were later refined and expanded to 10 foundational premises (Vargo & Lusch, 2008a). Put together, they highlight a focus on interactions between service provider and service receiver and the joint effort in making a service transaction meaningful. Foundational premises 6-8 should be brought to the attention of the reader in this context:

"FP6. The customer is always a co-creator of value.

FP7. The enterprise cannot deliver value, but only offer value propositions.

FP8. A service-centered view is inherently customer oriented and relational" (Vargo & Lusch, 2008a, p. 7)

The S-D logic perspective thus puts the customer in the centre of its activities, and claims that “[v]alue is always uniquely and phenomenologically determined by the beneficiary” (foundational premise 10 in Vargo & Lusch (2008a)). To conclude, the conception of services have gone from being something unproductive and not helping society’s advancement in Smith’s view, to being viewed as the centre of all economic transactions in the S-D logic view (which is arguably the leading school of thought within scholarly service management today).

2.2. Design

The chapter on design is divided into three parts; the first part tells the story of how the traditional design disciplines have evolved over time, whereas the second illustrates how computers brought about a new type of design. The third section gives an overview of design in the 21st century.

2.2.1. Traditional design

Although the academic discipline design is a relatively young one (it is commonly seen as having emerged after the Second World War (Gedenryd (1998), Bayazit (2004)), design in various forms has existed for millennia. Early examples are believed to have been achieved through a trial-and-error process rather than intended design process – Lucie-Smith (1983) exemplifies through the pointy stone arrowheads used by stone-age people. From this trial-and-error process, design evolved in the pre-industrial society through work in guilds, such as furniture makers (Lucie-Smith (1983), Heskett (2002)). As the fundamental details were mastered, design many times came to focus on the surface layout with an increased focus on especially skilled masters over guilds.

With the industrial revolution and the growing amount of products associated with it, many artists were employed at factories to improve the looks of products (Heskett, 2002). This led to the need for craftsman-designers, which could handle both engineering and crafts aspects of product development (Lucie-Smith (1983), Heskett (2002)). The most famous example of this is perhaps the German Bauhaus-movement, active between the two world wars (Lucie-Smith (1983), Heskett (2002)). The Bauhaus-manifesto focuses on architectural aspects but calls explicitly for craftsman-designers (Gropius, 1919), which were needed in all manufacturing areas. The structures of a school helped the development of theories, and with the establishment of learning environments came different schools of thought focusing on design. This was reflected in the emerging design theory, where European theory dominated on the

merger of arts and craft whereas American thought focused on style (Heskett, 2002). However, there was a reaction in America against products in which the quality did not match the promises made by the exterior style resulting in that “[s]ome leading designers, /..., began to evolve a concept of their role encompassing a vision of social improvement by working in concert with industry” (Heskett, 2002, p. 32). They argued for design as a strategic planning tool, to improve the competitiveness of companies (Heskett, 2002).

Similar thoughts occurred within architecture as the first scientific studies of design procedure emerged after the Second World War; “[i]n the face of the increasingly complex tasks that designers were encountering, the pioneers of the field saw a need for improved ways of designing” (Gedenryd, 1998, p. 19). This lead to a focus on the methods used for designing, usually referred to as *design methods*. Early important work includes Alexander (1964) and Jones (1970/1992). Design methods are normative schemes, which provide detailed ways of working for designers. Design methods include working procedure, which activities to perform and in which order they should be performed, and are expected to be followed closely. However, there was a swift reaction against the design methods movement. Gedenryd summarizes the reason well:

“Having said this much about design methods, there is but one thing to add: They don’t work, and they don’t work at all. In spite of all the good motives — the need for potent and up-to-date design procedures, the noble cause of being rational, and so on — the failure of these methods is a very solid and widely recognized fact, as is the thoroughness of this failure.” (Gedenryd, 1998, p. 59)

In the 1970s, both Alexander and Jones — two of the initiators of the design methods movement — were among the first ones to criticise it and they even encouraged people to abandon it (Gedenryd (1998), Bayazit (2004), Margolin (2010)). Their argument was the same as is manifested above by Gedenryd — that design methods do not work. The reason why they were perceived as failing was because they were too rigid, and thus inhibited the creativity of the designer. It should however be noted that the arguments from Gedenryd on the one hand and Alexander and Jones on the other hand, focus on the individual designer, and not on their use on organizational level. A second generation of design methods emerged, and became popular within some design communities, especially the engineering-leaning ones (Cross, 2001). Likewise the application of design methods on an organizational level started early (e.g. Luckman (1967) and has continued to this day Yang (2010)).

Published in the same period of time as the early literature on design methods, Simon (1969/1981) argued for a science of design. He views the science of design, as a science interested in what ought to be, which he distinguishes from natural science and its description of what is. He further describes design as a form of problem solving, and puts the focus on the process of finding possible design solutions. This view can also be found in Schön's (1983) highly influential description of the design process. He illustrates how an experienced architect in a teaching situation helps the student solve the design problems at hand by reformulating the "problem setting" (a term introduced by Schön himself). In Schön's view designing is about a continuous reflection, and an iterative process in which the designer at any time might need to go back to an earlier stage in the process and reflect on and challenge earlier decisions and self-set constraints. An experienced designer reformulates the problem until it is solvable, whereas a novice may get stuck due to not challenging earlier decisions.

The designers in Schön's (1983) example externalise much of their thinking and discussions to paper through continuous sketching. The externalization of thoughts and design ideas to sketches and other mediums is a recurring theme throughout the design literature (e.g. Rowe's (1987) early book on design thinking and Buxton's (2007) book on sketching in design). This, however, stands in contrast to how traditional theories of cognition explain how humans think. Cognition researcher Henrik Gedenryd explores this dichotomy in his PhD thesis (Gedenryd, 1998):

"Why do designers work out their designs physically, in the world, when the cognitive theories we have say that design should be done in the head? The starting point here is that conventional wisdom in cognitive science holds mental simulation, planning, etc. to be vastly superior to physically working on a problem, because it allows you to make predictions, test alternatives, and so forth. So why do designers not do what cognitive scientists say they should?" (Gedenryd, 1998, p. 101)

Gedenryd (1998) develops a theory of what he calls *interactive cognition*, a theory related to the arguably more famous *distributed cognition* theory (Hutchins, 1995). Interactive cognition views cognition as practical rather than intellectual. This means "that cognition is not organized around a mind working in isolation, but to carry out cognitive tasks through making the most of mind, action, and world working in concert" (Gedenryd, 1998, p. 147). According to Gedenryd, designers work the best when mind, action and world interact with each other.

However, in parallel to the evolution of the scientific study of design, there was another development which in due time came to have great impact on how design has evolved; the entrance and evolution of the computer.

2.2.2. Computer-focused design

Early computer history did not have very much to do with design, but as computers became more widespread, design of interfaces became a crucial task to ease the use of computers. Grudin (1990) describes how the computer interface developed from the early computers where the constructors were the only users, to the computer as a social work tool at many work places at the end of the 1980s. This changed both who the user of the interface was and from which related disciplines inspiration were taken. Table 1 below gives an overview of computer interface development from the 1950s to the 1990s:

Table 1 - Adaptation of Table 1 from Grudin (1990, p. 265), outlining the evolution of the computer interface

	Interface as hardware	Interface as software	Interface as terminal	Interface as dialogue	Interface as work setting
Principal users	Engineers/programmers	Programmers	“End users”	“End users”	Groups of end users
Interface specialist disciplines	Electrical engineering	Computer science	Human factors, graphic design, cognitive	Cognitive psych., cognitive science	Social psych., anthropology
Time period	1950s	1950s-1970s	1970s-1990s	1980s-	1990s-

As can be seen in Table 1, graphic design was integrated into the interface creation during the 1970s as the principal users moved from being people with a deep knowledge of how computers work to users who might only know how to handle the software at hand. When users could not be expected to understand the underlying structures anymore, the need to make possible actions clear increased radically. In light of this it is no surprise that the first graphical user interfaces emerged during this time period (Winograd, 1996).

As the roles of computers kept evolving, new fields of expertise were needed and the cognitive scientists entered the interface design-field. In the 1980s the field primarily focused on exploring basic *usability* issues. The introduction of psychology to the interface design meant that the focus was put on the end users. With time, this focus was strengthened and in the mid-90s many connections were drawn to the traditional design communities. Two landmark books from this era are “Bringing Design to Software” edited by Winograd (1996) and “Things that make us smart” by Norman

(1993), which included a chapter on distributed cognition. At the same time, several new publications focusing on the social use of computers emerged, launching the era of *interaction design* (note that the design-term here makes its entrance in the interface world). One such publication is the magazine *Interactions*, which was launched in 1994, and in which the editors in the inaugural issue stated:

“We seem to have moved well beyond the idea that making a computer ‘useful’ is simply to design a good interface between ‘man and machine.’ Our ideas have evolved to the point where the richness of human experience comes to the foreground and computing sits in the background in the service of these experiences” (Rheinfrank & Hefley (1994, p. 88) cited in Winograd (1996, p. xiv))

This attitude reflects FP10 from Vargo & Lusch (2008a) well: “Value is always uniquely and phenomenologically determined by the beneficiary”. Similar concepts such as quality-in-use are well explored within the interaction design field (see Ehn & Löwgren (1997), Holmlid (2002), Arvola (2005) and Arvola (2010)). As new design objects have emerged for interaction design such as web and mobile technology, this attitude has been strengthened even further. With time the borders between traditional products and interactive technology have become blurred and as a natural part of this the traditional design disciplines and the design emerging from computer science have come so close that they overlap extensively. Going into the 21th century, the historically different design disciplines had become one large design field with various sub-disciplines.

2.2.3. 21st century design

Indeed, when Buchanan (2001) analysed different types of design and the objects they deal with, he included interaction design as a design discipline among others and explicitly placed it within the design tradition:

“There is a common misunderstanding that interaction design is concerned fundamentally with the digital medium. It is true that the new digital products have helped designers focus on interaction /.../. However, the concepts of interaction have deep roots in twentieth-century design thinking.” (Buchanan, 2001, p. 11)

In his analysis of the objects the different types of design concern themselves with Buchanan (2001) found four different objects for design, with the fourth and outer being somewhat tentative at the time when Buchanan’s article was published. Figure 1 below shows Buchanan’s four orders of design with the object of their attention in

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italics. Outer levels encompass inner levels as a part of their process; e.g. graphic design is a part of all types of design.

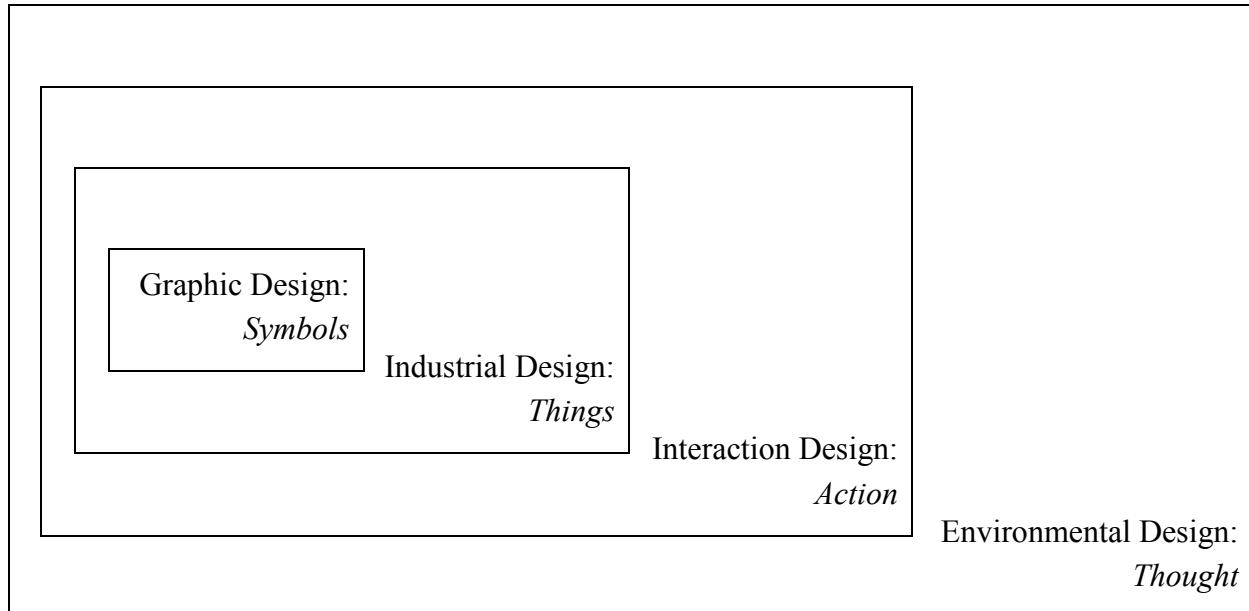


Figure 1 - Four orders of design and the objects they are concerned with. Adapted from Figure 1 in Buchanan (2001).

The environmental design suggested by Buchanan (2001) does not concern nature; it focuses on systems and artificial environments; “.../.. human systems, the integration of information, physical artefacts, and interactions in environments of living, working, playing, and learning.” (Buchanan, 2001, p. 12). The design outcome in this design order is focused on the idea/thought that governs the system at hand. Buchanan (2001) argues that the growth of new orders of design indicates a greater awareness on how objects of design are situated in the lives of individuals.

This line of thinking is also evident in the writings of Tim Brown (2008; 2009), in re-launching the design thinking concept. He describes how designers are called in earlier than previously in the process of developing new artefacts (compare with the outer orders in Buchanan’s (2001) model):

“Now, however, rather than asking designers to make an already developed idea more attractive to consumers, companies are asking them to create ideas that better meet consumers’ needs and desires. The former role is tactical, and results in limited value creation; the latter is strategic, and leads to dramatic new forms of value.” (Brown, 2008, p. 2)

Brown (2008; 2009) describes design thinking as a way of approaching problems (as done in Rowe (1987)). He frames it as a way of improving the innovative capacities within a company. Among the important characteristics for design thinkers, he lists empathy for the various stakeholders, an experimental mind-set and the willingness

and ability to collaborate over disciplinary borders. He argues that it is less about the training, but more about the perspective used by those who are called design thinkers.

Thus, design has moved from being decorative to become a perspective on solving complex problems.

2.3. Service Design

Designers first started to talk about service design in a structured way in the early 1990s, much through the efforts at two locations; Politecnico di Milano in Italy and Köln International School of Design in Germany. The portal figures for early service design in these locations were Ezio Manzini and Birgit Mager. In both locations, early work relied on the work done within services marketing. Services were portrayed as something different than products, and the thinking was clearly influenced by the IHIP-notion (see page 7). In 1997, the first book on service design was published and it was jointly edited by Milano and Köln-staff (Erlhoff, Mager, & Manzini, 1997). As many early publications on service design it was not in English; most publications were in Italian and German – in this case in German. It should be noted that the translated title of Erlhoff, Mager, & Manzini (1997) would be “Service Needs Design” (authors translation, German original: “*Dienstleistung braucht Design*”), and that the connections to the service marketing field are apparent throughout the publication.

Although they were exploring the designing of services simultaneously, the efforts in Milano and Köln took different directions. Milano focused on research and produced the first service design PhDs, highlighting topics which would later reoccur as a body of English language research emerged (see Pacenti & Sangiorgi (2010) for an English overview of research originally published in Italian). The efforts in Köln mainly focused on creating awareness of the emerging field, and their publications mainly argued for the rationality behind a service design approach (see Mager (2004) for a collection of essays translated into English).

These two pioneering locations were joined by new locations; in academia new service design researchers emerged in Sweden, USA and the UK, and the Italian community expanded to new locations. Outside of academia early pioneering companies were primarily UK-based. According to several sources (Moritz (2005), Moggridge (2007)) the first service design consultancy was created as live|work was founded the summer of 2001 (Han (2010) points towards that the term was used by consultants already in the early 1990s however). In 2002, the large design consultancy IDEO started to explicitly offer service design to their clients (Moritz, 2005). By 2004 the community had grown to such an extent that a service design network was founded by academics from “Köln International School of Design, Carnegie Mellon University, Linköpings

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Universitet, Politecnico de Milano / Domus Academy and the agency Spirit of Creation” (Service Design Network).

The service design community continued to grow, but most publications still focused at arguing for service design from a variety of perspectives (Blomkvist, Holmlid, & Segelström, forthcoming). To use the terminology of Brown, Fisk, & Bitner (1994), service design was still in the *Crawling out* stage (see page 6). However, it can be argued that service design started moving into the *Scurrying about* stage around 2007-2008; publications at that time started to focus on how service design relates to other fields (Holmlid, 2007), academic projects on how service design is done in practice appeared (Kimbell & Siedel, 2008), and the first conference of the International Service Design Network was held in 2008. Blomkvist, Holmlid, & Segelström (forthcoming) provides an overview of peer-reviewed material published in 2008-2009 and identify two main approaches to service design research:

“There seem to be two main approaches to this early research on service design. One is to widen the scope of service design and integrate practices and ideas from non-design fields, such as marketing, leadership and engineering. The other is to challenge and explore the basic assumptions in service design and the methods inherited from other disciplines.” (Blomkvist, Holmlid, & Segelström, forthcoming)

Furthermore, Blomkvist, Holmlid, & Segelström (forthcoming) identify the following trends in research in service design:

- » *Design theory*: Exploring the philosophical underpinnings of the discipline, and its relation to other design disciplines.
- » *Management*: Learning from and integrating with existing thought on services within management/marketing.
- » *Systemic approach*: Focusing on product-service systems with an engineering perspective.
- » *Design techniques*: The tools and techniques used in service design projects.
- » *Case studies*: Descriptions and explorations of projects done with a service design focus.

The emphasis on service design taking a holistic perspective on services is what is common to all these trends. This view resonates with the descriptions of services and design respectively. Services are commonly seen as systems consisting of people, artefacts and their interactions. Service has become a way of viewing human interactions. Service design can thus be described as the use of a designerly way of searching for solutions to problems in people-intensive service systems through the engagement of stakeholders.

2.3.1. Design techniques in service design

The focus of the studies presented herein falls under the category *design techniques*, as the term is used by Blomkvist, Holmlid, & Segelström (forthcoming). An excerpt from a dictionary definition of service design introduces the techniques:

“Service designers visualise, formulate, and choreograph solutions to problems that do not necessarily exist today; they observe and interpret requirements and behavioral patterns and transform them into possible future services. This process applies explorative, generative, and evaluative design approaches, and the restructuring of existing services is as much a challenge in service design as the development of innovative new services.” (Mager, 2008, p. 355)

Explorations of design techniques have focused on issues of user-involvement – the user as participant in the design process as well as ethnographic approaches to observing them (Segelström, Raijmakers, & Holmlid (2009), Raijmakers et al. (2009), Holmlid (2009), Kaario et al. (2009), March & Raijmakers (2008)). Papers have also been published on how to learn from precedents (Blomkvist & Holmlid, 2009).

The insights from the user-involvement process need to be gathered and reported in an appropriate way. As is suggested by Gedenryd (1998) above, designers like to externalise their thoughts and processes, which has lead to that service designers represent their insights externally. This is done in various ways, but always highlighting the specific insights – often through graphic representations. These representations are known as visualisations.

Although various visualisation methods used by service designers, such as service blueprints (Shostack, 1982; 1984) have been known and adapted (Mager, 1997) since the early days of service design, visualisations have received little interest from the academic service design community. In early academic writings on service design, visualisations were mentioned in passing (Erlhoff, Mager, & Manzini, 1997), if at all (Mager, 2004).

In contrast, the practicing community took the leading role in highlighting the use of visualisations. Case studies by service designers prominently feature visualisations of various types for different stages of the design process, from describing the current situation to envisioning final design suggestions. Examples include the use of personas in ‘The Diabetes agenda’ (Burns & Winhall, 2006)), scenarios in ‘Activmobs’ (Vanstone & Winhall, 2006) and stakeholder mappings as well as future customer journeys in ‘Dear architect’ (Engine, 2007).

The academic community writing about service design has responded to this, and recent texts often include references to the widespread use of visualisations within

service design (Mager (2008), Moritz (2005) and several authors of chapters in Miettinen & Koivisto (2009)). Holmlid (2007) draws the conclusion that service design is a highly visual design discipline. In her work on service design tools, Tassi (2009) lists a number of visualisations under the heading *Representations*. A typical formulation on visualisations can be found in Maffei, Mager, & Sangiorgi (2005):

'The main and distinctive focus of service design tools concerns the design, description and visualization of the user experience, including the potentials of different interaction modes, paths and choices (Flow Diagrams, Storyboarding, Use Cases, Customer Journey, Video Sketching, Video Prototyping, Dramaturgy, etc). Other tools try to support the representation of the complexity of service organization like Blueprint, Service ecology, Service system map, Social network mapping, etc.' (Maffei, Mager, & Sangiorgi, 2005, p. 6)

However, much that is written about visualisations within service design is still written by practitioners, writing short chapters in books by academics, such as Samalionis (2009), Winhall (2009) and Koivisto (2009), or being interviewed for books, such as the founders of live|work in Moggridge (2007). Visualisations are often mentioned as one of the main strengths of service designers in texts written to convince companies to invest in service design, such as 'Transformation Design' (Burns et al., 2006) and 'Journey to the Interface' (Parker & Heapy, 2006) – texts which are, once again, written by practitioners.

Although the profile of visualisations in written texts has increased, there is still little research on visualisations in service design. As a part of the documentation for the 'Designing for Services'-project (Kimbell & Siedel, 2008), Whyte wrote a short section titled 'Visualization and the design of services' (Whyte, 2008). She focuses on potential future research on visualisations and how meaning is created in visualisations, as well as the implications for design education. The video documentation (Kimbell, 2008) from the same project provides some insights on visualisations however, especially in the section 'Making the services tangible and visible' (starting at 4.13). In this the frequent use of visualisations is identified as one of the three characteristics that define service designers' work in comparison to other design disciplines. Lucy Kimbell (2009a; 2009b) has later elaborated on her findings, stating that one of the main goals behind visualising is to make the services more accessible as a design object. She also notes that different companies used different techniques, but does not expand on the topic.

One of the few studies focusing on service design visualisations in general was written by Diana, Pacenti, & Tassi (2009). In it, they construct a framework for understanding

visualisations based on two axes; time and iconicity. With the help of the axis they identify four general types of visualizations – maps, flows, images and visual narratives.¹

Froukje Sleeswijk Visser (2009) frequently uses visualisations in developing a framework for transferring user knowledge from those who have gathered user insights to designers (which may not be the same persons). She developed her framework in relation to products as well as services, and uses visualisations as a tool to communicate three aims in the knowledge transfer; enhancing empathy, providing inspiration and supporting engagement. Sleeswijk Visser (2009) explores issues relating to visualisations, in regard to the look and feel of the visualisations and their effect on the knowledge transfer. She finds that designers prefer ‘real’ material such as photos over sketched material.

To summarise, service design is a relatively new field which has its roots in the design field, but draws knowledge from other disciplines focusing on services as well. The service design field can be described as a maturing field. However, much which is seen as knowledge in the field is still based on anecdotes rather than research. One such area is visualisations of insights gained throughout the service design process. The goal of this thesis is to provide a scientific base for discussions on visualisations by describing the current use of visualisations and exploring what aspects important for service design that visualisations communicate.

¹ Please note that Diana, Pacenti, & Tassi (2009) is used as a framework in the second study presented in this thesis and is introduced in further detail in that context.

3. Interlude: Visualisation techniques

To give the readers of this thesis a clearer understanding of visualisation techniques used in service design, this chapter describes some of them. Each of the visualisation techniques is described by both text and illustration. The text segments describe the main traits of each technique and the illustrations give an example of what a visualisation of any given type might look like. The visualisation techniques presented here are based on the categories obtained in the second study (see page 51).

Just like the visualisations studied, the visualisations presented herein all have different degrees of refinement. To highlight the differences between the various visualisation techniques better, all visualisations are based on the same scenario:

A PhD student at Linköping University is working on his thesis in the middle of the summer. The hallways of his department are empty. The only other person who still is working is one of the administrative staff which is preparing the material to be sent out to the new students accepted to the university's fall semester. The sun is shining outside and as the afternoon progresses the two of them just long to go outside. Finally, the PhD student decides to take a break and get an ice-cream. He asks his colleague if she wants to come along, and they both go to the on-campus convenience store to get an ice-cream. Upon arrival, they select and pay for their ice-creams before they find a nice spot outside to sit and enjoy their ice-creams.

The techniques which are introduced (in alphabetical order) are:

Interlude: Visualisation techniques

- » Blueprinting
- » Customer Journey
- » Desktop Walkthrough
- » Persona
- » Storyboard
- » System map

3.1. Blueprint

As the name indicates, the service blueprint concept is inspired by architectural blueprints. They provide a mapping of how the service process is meant to work. This is done by sorting the various actions in a service into categories, connecting these actions to each other as they would occur in the service transaction.

The service blueprint has been adopted from the service management/marketing field. Originally introduced by Lynn Shostack (1982, 1984) in the early 1980s the technique has received much attention and been the subject of many research papers. Bitner, Ostrom, & Morgan (2008) summarizes the improvements made over a period of 25 years and presents the blueprint in the form it developed into as it grew more complex with time.

From a service design perspective, the technique has been explored from a variety of angles; Wreiner et al. (2009) explores how blueprints could be used in a setting where the service delivery company acts as the middleman between the end customer and the owner of facilities, in this case parking houses. Sparagen & Chan (2008) investigates ways of integrating an emotional view of the customer's experience and expectations in the blueprint. Similarly a research group from Lucerne has developed Blueprint+, which expands the blueprint with emotional and cost aspects. They also suggest a change from the traditional stages to mapping according to characters (Polaine (2009); Aebersold, Polaine, & Schäfer (2010)).

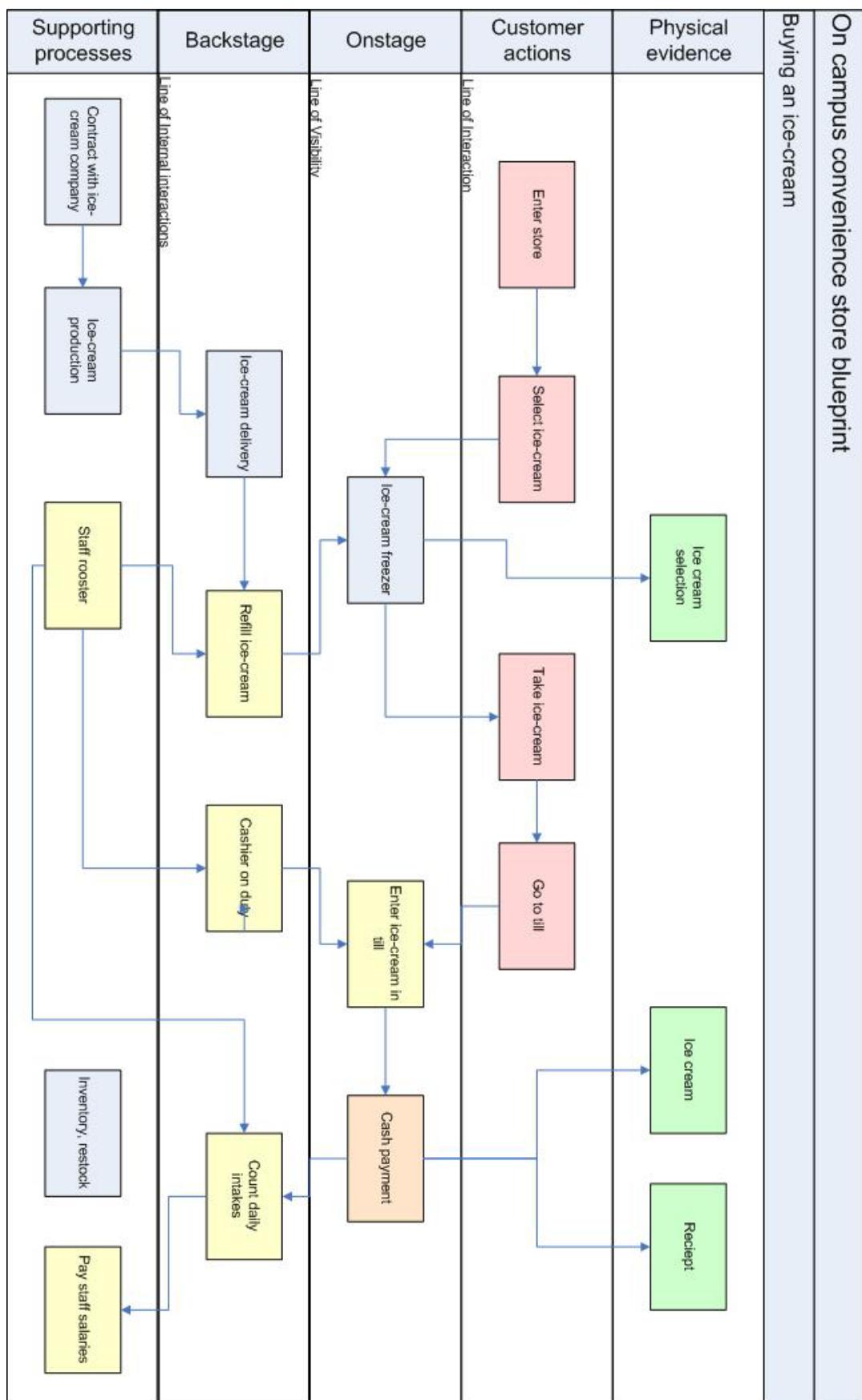
In Shostack's (1982) original presentation of the idea there were only two sections — frontstage and backstage. Parts of the service which the customer noticed were placed in the frontstage and those she didn't see (such as re-stocking) in the backstage. In the updated model presented by Bitner, Ostrom, & Morgan (2008) there were five sections:

- » *Physical Evidence*: A tangible evidence of that the service has been provided.
- » *Customer Actions*: Actions by the customer without interacting with the service touchpoints².
- » *Onstage*: Interactions between the customer and the service touchpoints.
- » *Backstage*: Actions by service employees which aren't directly visible for the customer.
- » *Support Processes*: Subcontractors and actions easing other actions, such as scheduling.

² A touchpoint is a place in the service where direct interaction occurs between the customer and a representative (human or machine) of the service.

The different sections are divided from each other by lines, which are named after their role from a customer perspective. The *line of interaction* goes between customer actions and onstage, the *line of visibility* divides onstage and backstage from each other and finally the *line of internal interaction* is placed between backstage and support processes.

Blueprints are very flexible in regard to the amount of detail which needs to be put into them – they can be a tool to map out the main activities in a service or a detailed explanation of everything that is going on within the service system. They provide an idealised image of the organisational structure of the service.



3.2. Customer journey

The customer journey follows a customer throughout a service, and often also in the stages before and after the service interaction. As it depicts the service from the customer's perspective, it focuses on what the customer sees and experiences, which not necessarily are the most important moments to make the service work. Alas, it does not provide a structure of how the service works. Instead it highlights the process which will be the basis of how the customer will experience the service – the focus is emotional rather than operational.

Customer journeys (or experience journey or user journey or customer journey map) emerged early in service design, originally with a strong focus on touchpoints (see Parker & Heapy (2006) for an early publication with a service design customer journey). The customer journey is probably the most used visualisation technique for public presentations of service design projects. In spite of this, it is hard to find any publications focusing on customer journeys; Koivisto (2009) has a descriptive focus on the technique. The customer journey is a dynamic tool. It can take many forms and the evolution of the technique seems to be based on inspiration and adaptation of other's customer journeys rather than guided efforts.

Customer journeys and blueprints thus complement each other in giving an overview of the service. Customer journeys are ideally created by following and documenting actual customers in the service setting. Elements that are reoccurring in many customer journeys are:

- » Time-aspect
- » Interactions
- » Emotional triggers



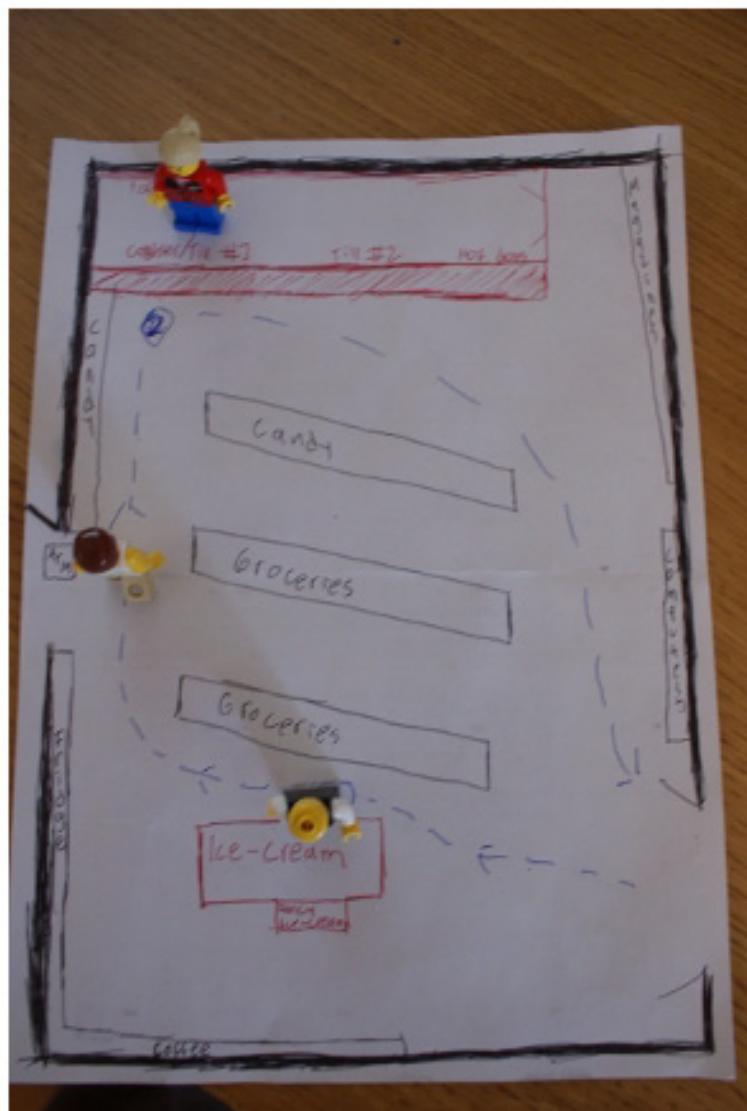
3.3. Desktop walkthrough

Desktop walkthroughs can both serve as a visualisation and quick-n-dirty prototyping tool. Desktop walkthroughs are representations (or imaginations when used as a prototyping tool) of the service in a small scale. Focus is often put on the humans in the system and small figurines (such as Lego) are used to depict their place in the service system. Various kinds of markers are used to depict the tangibles in the service – drawings on the surface and small Lego props are both common. The basic setting thus recreates the servicescape³ and lets the designers enact the service delivery in it for a low cost. By using it in conjunction with the persona visualisation technique a variety of situations can be imagined.

Desktop walkthroughs have not been described as such in the literature, and is known under a variety of names depending on the context. For example, there is no single entry on desktop walkthroughs on the Service Design Tools website (Tassi, 2009) but various examples of desktop walkthroughs can be found under the headings “Lego serious play”, “Role playing” and “Rough prototyping”.

The service design consultancy Engine defines the value of using desktop walkthroughs on their website: “[a] better understanding of the choreography of the service elements, and insight into any impractical [sic!] or illogical ideas and moments” (Engine).

³ The servicescape denotes the physical environment in which the service takes place. See Bitner (1992) for more information.



3.4. Persona

A persona is a representation of a customer segment in form of an idealized person. Personas should always be based on thorough research of the users of a service or product. A large number of users/customers should be interviewed and the results of the interviews should be analysed and clustered according to common traits. Based on the clustering the persona categories emerge with different traits influencing their interactions and/or attitude towards the service. From these traits and other commonalities between the individuals in the cluster an imaginary person is constructed. The various personas constructed should together capture all important attitudes which are held by the users of the service.⁴

As the design process continues, the personas are used as stand-ins for the actual users of the service to check feasibility of ideas and that any important features aren't missing. Personas, however, are not meant to replace the actual users, rather they are meant to be a good way of reflecting on user needs between user testing sessions.

Personas emerged as a technique within interaction design and were first presented by Cooper (1999). The technique quickly became very popular and is well documented in literature (see Pruitt & Adlin (2006) for a full book on the technique) as well as a standard feature in textbooks on (interaction) design (Cooper, Reimann, & Cronin (2007); Goodwin (2009); Saffer (2007)).

⁴ The persona example is based on the persona sheet developed by Mattias Arvola and available through his webpage (Arvola, 2009). Used with permission.

ON CAMPUS CONVENIENCE STORE CUSTOMERS					
Name	Fabian Segelström				
Role	Now and then customer				
Age	28	Sex	M		
Tag line	"I need my afternoon break"				
Description	PhD student working hard towards dissertation deadline				
MOTIVATIONS AND GOALS		ACTIVITIES			
Experience goals	Wants to relax and think about other things than work				
End goals	Recharge energy				
Life goals	Help spread the word about service design				
Business- and organisational goals	Hand in dissertation				
Technical goals	No hassle service				
Picture					
Typical purchases	Ice-cream, lunch, coffee				
Important atypical purchases	Cigarettes, magazines				

3.5. Storyboard

Like the customer journey, the storyboard shows how a service exchange develops over time. Storyboards consist of images or drawings of crucial moments in the service exchange, putting focus on touchpoints and interaction. Compared to customer journeys they provide a more focused version of the service in which the non-interacting moments often are disregarded.

The storyboard technique has its origins in the movie industry that adapted the storytelling-style of comic books (McCloud, 1993) to depict the storyline of a movie pre-production (Goodwin, 2009). Storyboarding was adopted for use within interaction design as a way of depicting how the interaction develops over time (Carroll (1999); Goodwin (2009); Cooper, Reimann, & Cronin (2007)). In service design storyboards are usually used to depict a customer's interaction with the service, but could also be used to tell how the service develops for an employee.

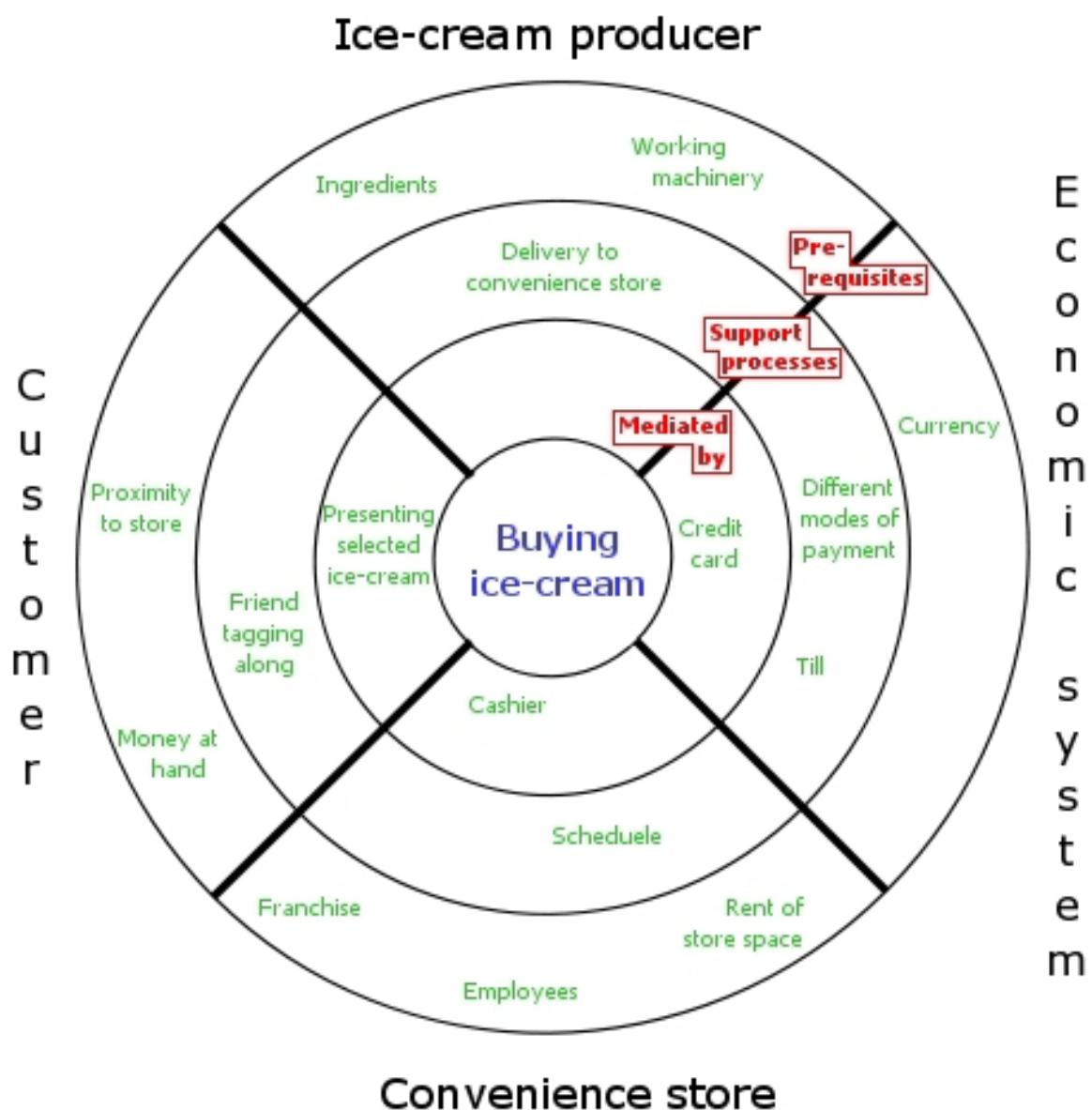
Storyboards can be either sketched or built by using photographs. When building the storyboard, the designer should pinpoint the most important aspects of the service and highlight them as the customer interacts with/notices them.



3.6. System map

System maps are the most diverse group of the visualisation techniques presented here. As the name indicates it is all about mapping the components in the system. In contrast to blueprints, the mapping is usually done according to groups rather than stages. Different stakeholders might influence a service in various ways and from different angles; the effect on a service of the frontline staff and the laws of the nation are very different. Groups can be defined in various ways; they need not to be stakeholders. They could also answer questions like how and why.

Various tools which can be described as system maps have been used since the early days of design methods (see Jones (1970/1992)). Published examples from service design include stakeholder mappings in Holmlid & Evenson (2006) and co-design opportunities in Burns & Winhall (2006).



4. Study 1: Interviews on visualising user research

Study 1 is based on interviews with practicing service designers on how they work with visualisations of the insights they gather from user research. The layout of the chapter is as follows: section 1 introduces and describes the details of the interviews performed. It is followed by section 2 and 3 outlining the research questions and analysis procedure respectively. Section 4 describes the analysis framework used in the study. The results of the research are presented in section 5. Finally these findings are discussed in section 6.

4.1. Data collection

The data in this study is based on interviews with practicing service designers. All agree that they are doing service design, although a few prefer other professional titles such as “user experience designer”. A total of 14 interviews were conducted. Ten interviews were face-to-face and four were performed over telephone/Skype. 13 of the interviews were conducted by the author and one by a second interviewer⁵. Most of the interviews were conducted with a single interviewee, but in four interviews there were two persons being interviewed together.

The interviews were conducted between October 2008 and January 2009, with a majority done during the Service Design Network conference week in Amsterdam in

⁵ Many thanks to Johan Blomkvist for conducting one of the interviews.

late November 2008. The primary workplaces of the interviewees were in seven different countries at the time of the interviews.

The companies in which the interviewees worked at the time of the interviews ranged from world-leading to newly started companies; from large design firms to small service design firms; from commercial and public to social innovation firms; some were multi-national and others were national. All interviewees but one worked as consultants.

The overall focus of the interviews was to collect data about service designers' attitudes and opinions about the user research phase of the design process. The interviews were semi-structured; the questions used can be found in Appendix 1. Notes were taken during the interviews and 13 of the interviews were recorded. The interviews lasted for a total of 13h and 42 min, with the median being about 56 min.

The data focused on in this study concerns what the designers say about methods and techniques for visualisations. Sections of the interviews not concerning visualisations were not used in this study.

4.2. Research questions

The study was guided by a series of research questions constructed to answer and map the basic attitudes of service designers in regard to visualisations.

4. To what degree are visualisation techniques used by service designers and what are they based on?
5. In which stages of the design process do service designers use visualisation techniques?
6. What types of visualisation techniques are used by service designers?
7. For what reasons are visualisations used in service design?
8. Which factors influence the choice of visualisation type?
9. Are there any patterns in choices of visualisation type based on the underlying reason for visualising?

The analysis was constructed so that each of the research questions was answered separately.

4.3. Analysis

The analysis was conducted in several steps. The recorded interviews were analysed according to a defined scheme aimed at contributing to the underlying research interest. The analysis focused on the aggregate knowledge gained from the interviews (rather than finding discrepancies between different interviewees). The information

found was further analysed and placed in a matrix. The data from the matrix was then analysed to answer the research questions. The process of answering the research question was as follows:

To what degree are visualisation techniques used by service designers and what are they based on: The question was answered by quantitatively counting the answers of the interviewees on the direct question “Do you visualise the data you have collected?”. The process of finding what the visualisations are based on was primarily based on responses to one question “Do you choose type of visualisation depending on the data you have collected, or do you look for certain types of data to be able to fit it into a preferred way of visualising?”, and it was complemented by discussions interviewees held based on other questions.

In which stages of the design process do service designers use visualisation techniques: To answer the question, all visualisation techniques mentioned throughout the interviews were mapped onto the corresponding section of the ASB Model (Dubberly, Evenson, & Robinson, 2008). The balance between the various segments then provided a visualisation of its own, describing in which stages of the design process the visualisation techniques are used first.

What types of visualisation techniques are used by service designers: The segmentation from the previous question was then used as the base for a clustering of the various visualisation techniques that are used by service designers. A separate clustering of visualisation techniques was done within each section of the ASB Model. The various clusters found were given names based on their characteristics.

For what reasons are visualisations used in service design: The question was answered by mapping the reasons stated by the interviewees and then grouping them together according to themes in the answers.

Which factors influence the choice of visualisation type: The influence on the type of visualisation type was asked by a direct interview question, and the analysis aimed at finding the common aspects in the interviewees’ answers.

Are there any patterns in choices of visualisation type based on the underlying reason for visualising: The last research question was answered by performing a meta-analysis of the earlier research question results. The various answers were matched together to find patterns which the interviewees might not be aware of themselves.

4.4. Analysis framework

In framing the results found in the study the Analysis-Synthesis Bridge Model (henceforth ASB model) was used. It was suggested by Dubberly, Evenson, &

Robinson (2008) as a way of describing the design process. It was deemed as an appropriate model as the goal of the model is to capture the connection between the analysis and synthesis phases in the design process, which the authors felt were missing in earlier models (see Dubberly (2005) for a wide range of other models). Figure 2 outlines the ASB model.

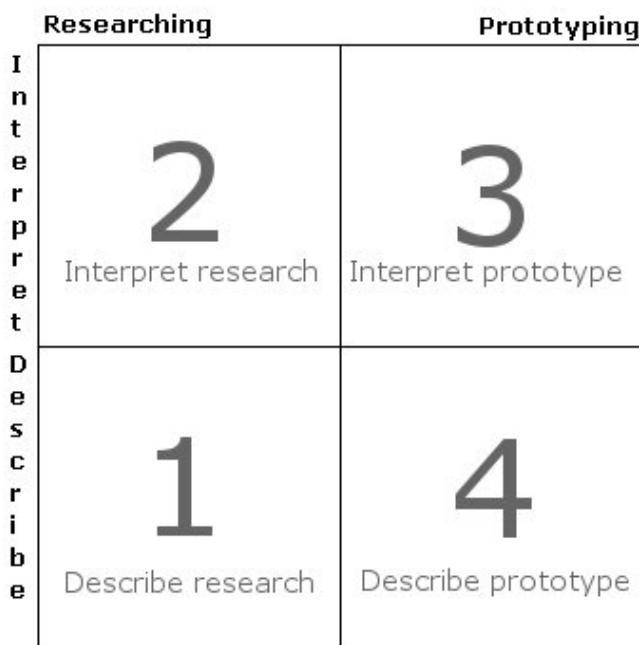


Figure 2 - The Analysis-Synthesis Bridge Model with its four sections numbered according to their placement in the design process.

The model is constructed as a two-by-two matrix where the flow starts in the lower left corner and ends in the lower right corner. The left hand side is labelled “Researching” and the right hand “Prototyping”. These two labels also correspond to the analysis and synthesis in the name of the model. The top row of the model is labelled “Interpret” and deals with the designer’s abstractions of the world, whereas the bottom row is labelled “Describe” and deals with the concrete.

The schema proposed in Dubberly, Evenson, & Robinson (2008) can be used as a way of structuring visualisation techniques. The left column is of most interest to the work presented here, and the move from field 1 to field 2 is described as follows: “We make sense of research by analysis, filtering data we collect to highlight points we decide are important” (Dubberly, Evenson, & Robinson, 2008, p. 57).

4.5. Results

The result section is divided into sections for each research question, presented in the same order as previously.

4.5.1. To what degree are visualisations used?

As a part of the interviews the participants were asked whether they visualise the findings from their user research in any way, and all but one answered that they did. Interestingly enough, the interviewee who claimed that he didn't visualise the findings, later actually mentioned various techniques for visualising data (such as personas) as a part of his regular tool kit. Most respondents seem to perceive visualisation as a part of the design process.

When asked what their choice of visualisation was influenced by, most interviewees claimed that the nature of the data collected decides how to visualise the findings. Interestingly enough, a few interviewees stress the importance of choosing the visualisation technique based on what they perceive as the most effective way to communicate their findings to their client organization. Others have developed ways of co-creating the visualisations with their clients, using these techniques almost exclusively. No one claimed to try to find data to fit certain preferred ways of visualising.

The findings above clearly show that visualisation techniques are, if not universally, almost universally claimed to be used by service designers. There are, however, differences in regard to which criteria these visualisations are based on. The nature of the data is claimed to always play a major role in creating a good visualisation.

4.5.2. In which stages are visualisations used?

Throughout the interviews, a total of 57 various techniques were mentioned, with 89 instances of a technique being named. Note that only techniques mentioned by exactly the same name were integrated to one technique. They were mapped into the four sections of the ASB model corresponding to where in the service design process they can first be used. Figure 3 visualises the results of the mapping. The actual numbers for the four sections are shown in Table 2.

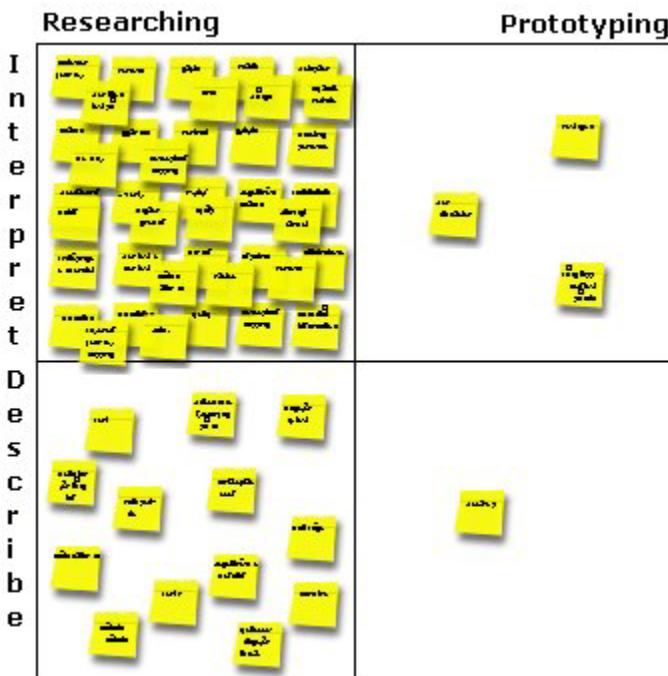


Figure 3 - Visualisation of the mentioned techniques inside the ASB model.

Table 2 - Numbers of techniques found spread across the ASB model

	Researching	Prototyping
Interpret	40	3
Describe	13	1

These numbers correspond to the fact that about two thirds of all visualisation techniques that have been mentioned first are being used to interpret data in some way. This shows that visualisations are very important in the “Interpret research”-phase of the ASB model. Naturally, many of the techniques can be used at later stages as well – a description of the existing (interpret research) and the suggested (describe prototype) service is likely to be formulated in similar ways.

4.5.3. Types of visualisation techniques used

After the methods had been mapped to the four sections in the ASB model, they were grouped together in smaller groups within the sections. This grouping depended on which kind of visualisation method they belonged to. A total of 17 groups were found. Table 3 lists the groups found. The numbers refer to the actual instances these methods were named by different interviewees.

Table 3 - Groups of visualisation methods found listed with the sum of instances named.

Group	Technique	n	Group	Technique	n
Co-creation	Interactive story	1	Narratives	Story	3
$\Sigma 2$	Interactive session	1	$\Sigma 12$	Comics	1
Personas	Persona	9		Narrative	1
$\Sigma 10$	Portrait	1		Posters	1
Highlighting	Critical service moments	1		Storyboard	4
$\Sigma 5$	Opportunity map	1		Pictures+text	2
	Vignette	1	Drama	Acting	1
	One-liners / Quotes	2	$\Sigma 3$	Enacting personas	1
Journey	Illustrations	1		Role play	1
$\Sigma 17$	Customer journey	6	Pre-modelling	Preparing tools for workshops	1
	Experience journey	1	$\Sigma 2$	Metaphors	1
	Stakeholder journey	1	Process	Use-cases	1
	Journey mapping	1	$\Sigma 2$	Process map	1
	Layered journey mapping	1	Sensitizing	Moodboard	1
	Scenario	4	$\Sigma 2$	Coffee table books	1
	User scenario	1	Synthesis	Conceptual mapping	1
	Sketches	1	$\Sigma 4$	Frameworks	1
Media	Film	6		Post-its in project rooms	1
$\Sigma 10$	Photo	2		Synthesis of observations	1
	Sounds	1			
	Websites	1			

Study 1: Interviews on visualising user research

Group	Technique	n	Group	Technique	n
Presentation	Diagrams	1	Material	Video from research	1
$\Sigma 6$	Schemes	1	$\Sigma 3$	Photo from research	1
	Functional analysis	1		Sounds from research	1
	Data clustering	1	Prototype	Prototype	2
	Tree structures	1	$\Sigma 2$		
	Blueprint	1	Compiling	De-brief documents	1
Props	Actionable artefacts	1	$\Sigma 4$	Video blog	1
$\Sigma 2$	Tangibles	1		Blog	1
Testing	Mock-up	1		'Normal research rapport'	1
$\Sigma 1$					

Among the 17 groups one was excluded from further analysis; Media. The reason for this was that the characters of the mentioned techniques under this heading either are so general that they can be used to represent several different things, or are to be considered as vehicles for presentation of visualisations and not visualisations of their own. The position of the remaining 16 groups in the ASB model are visualised in Figure 4, where the size of the bubbles indicate the number of methods included in the group.

As can be seen in Figure 4, the majority of the groups found are located in the “Interpret Research” section of the ASB model. As the names indicate, the various groups in this section have a somewhat different nature – some are tools for translating raw data into more accessible data and some aim to communicate insights.

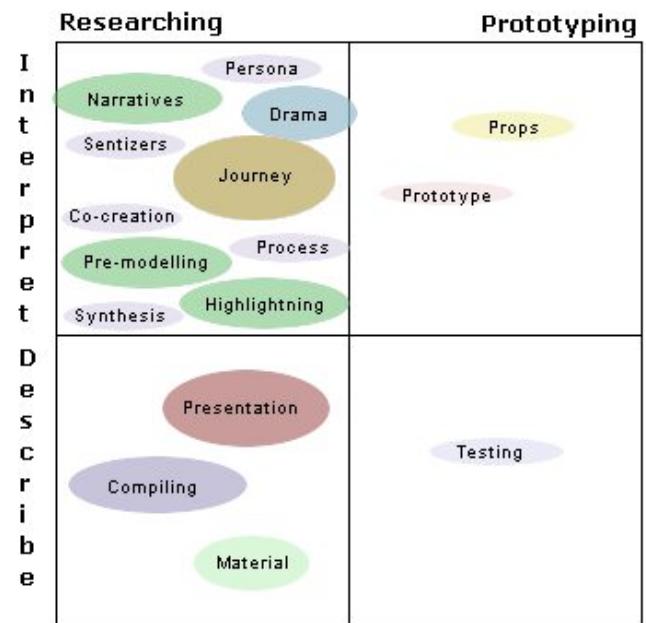


Figure 4 - Types of visualisations. The size of the bubble indicates the number of mentioned techniques included in it.

4.5.4. Motivations for visualisations in service design

To find the main reasons for professional service designers to use visualisations, the reasons stated throughout the interviews were analyzed and placed in groups depending on their line of argument. A total of 20 different lines of arguments were found in the interview material. Figure 5 below lists these arguments, sorted in three categories of reasoning.

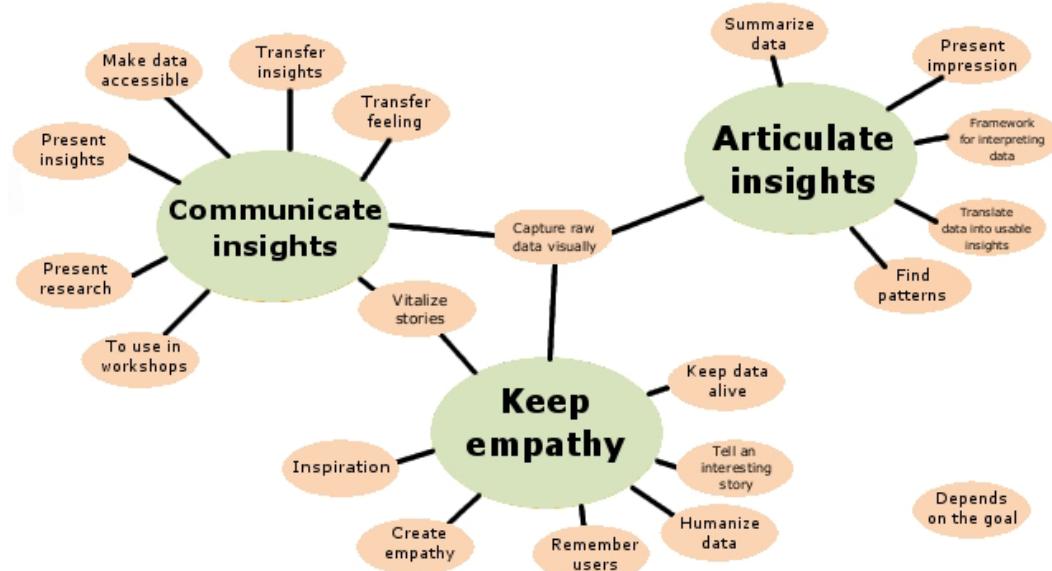


Figure 5 - List of arguments for using visualisations sorted in categories according to type of reasoning. A tabulation of the results is available in Appendix 2

As the figure shows, three main reasons emerged from the data: to help the service designers formulate insights from the user material collected, to communicate these insights to their clients and as a way of keeping the data ‘alive’. Out of the 20 reasons to visualise, 17 could be mapped directly to one group; two were connected to more than one group. These two were ‘Vitalize stories’, which relates to both keeping empathy and communicating insights and ‘Capture raw data visually’ which relates to all three groups. The final argument can be seen as a summarization of the other 19: ‘It depends on the goal’.

4.5.5. Influences on the choice of visualisation type

When it comes to influences on the choice of visualisation type, the interviewees give two main reasons; the nature of the data collected and the goal of the visualisation. The goals vary in many ways as can be seen in Figure 5 above. The two reasons may be broken down even further, as the communication of insights might be aimed at the client organization just as well as to participants in co-creation workshops. Interviewees also stress the difference in nature of the visualisation in regard to whether they are meant to be viewed by external persons or to facilitate the process

within the design team. Visualisations directed towards external persons are usually made simpler and more aesthetically appealing than internal visualisations which are often left complex and crude in their style – it may be as simple as a wall of post-its.

The nature of the data influences in multiple ways as well – different projects lead to different ways of collecting user input. Some projects may support recording of video material, whereas others not – something which naturally has a major impact on how the data later is visualised. The other way is related to the content, rather than the shape, of the data. When improving on an existing service, making a service blueprint of the current situation might help the understanding of the context as well as identifying design opportunities, whereas creating a new service requires other approaches, such as future scenarios.

4.5.6. Patterns in choice of visualisation type

When investigating the visualisation techniques used, it was found that the interviewees universally claimed to let the data and the goal of the visualisation influence how user input was visualised, rather than choosing to fall back on preferred ways of doing things.

However, a look at the tabulation of visualisation techniques listed above (see page 43) gives the impression that there is a basic set of visualisation techniques for service designers. A renewed and expanded look at the categories of techniques further strengthens this impression.

If the number of companies mentioning a technique in a category is added, one can see that there seem to exist a few basic techniques that most companies use, such as customer journeys and personas. Additionally, a long tail of types of visualisations only used by a small number of companies exists.

An adaptation of the table from page 43, with the tools used for prototyping removed, is presented in Table 4 below. The table is extended with the number of companies that mentioned a technique within each category.

Table 4 - Visualisation techniques for research interpretation, total number of times they were mentioned and the number of companies mentioning them.

Category	Total	Comp.	Category	Total	Comp.	Category	Total	Comp.
Journeys	17	11	Highlighting	5	5	Co-creation	2	2
Narratives	12	8	Compiling	4	3	Pre-modelling	2	2
Personas	10	9	Synthesis	4	3	Sensitizing	2	2
Media	10	6	Drama	3	3	Process	2	2
Presentation	6	4	Material	3	2	Props	2	1

4.6. Discussion of study results

The discussion is divided into two sections to highlight the main features of visualisations; to support the user research and to communicate the results of the same.

4.6.1. Visualisation to support research

The findings show that service designers tend to start using visualisation techniques in an early phase of the design process. The analysis shows that most visualisation techniques can be used already in the research phase (53/57 listed techniques are in the research phase). This needs to be interpreted in the light of the questions asked and not be taken as a fact.

The questions focused on the user research phase of the design process. This does not explicitly exclude answers regarding later stages of the design process, but on the other hand implicitly puts a focus on the left-hand side of the ASB model. This means that there could be visualisation techniques which are only used in later stages, which were not mentioned by the interviewees.

In the left-hand side of the ASB-model, one finds most techniques in the interpret-research area, 75% (40/53) of the techniques. The techniques found in the describe-research phase are either raw user data (such as video-material) or abstract descriptions of the current state of the service (such as blueprints). The techniques in the interpret-research are, however, all subject to highlighting of certain aspects. That is, the visualisation techniques suggested by the designers are not used as simple tools to map and describe what is, but rather serve the purpose of interpretation and understanding of the data collected throughout the user research. Thus, the visualisations in the interpret-research area serve as a bridge between user research and ideation.

4.6.2. Visualisations as a communication tool

The interviews conducted reveal that there are three main influences affecting the choice of how to design a visualisation of service design research; intended audience of the visualisation and the nature and content of the research data. The fact that the audience of the visualisation is very important for how the end result will look can also be noted in the fact that ‘communicate insights’ to clients is one of the three main reasons for creating visualisations, whereas the two other reasons are mainly directed at the design team.

Looking at which kind of visualisation types are used by the service designers, one can see that certain types are predominant among the answers by the interviewees, whereas most types are only used by a few. Journeys, narratives, personas and the use of data collected through visual and/or audio media seem to be the basic visualisation techniques of service design. Visualisations outside these groups are usually developed and used by only one company. A key difference between the basic visualisation techniques and the proprietary ones is that the basic techniques can be used to achieve more than one of the goals stated for which visualisations are created. The proprietary ones, however, usually only achieve one of the goals for visualising. Personas, for example, is a technique which can be used to achieve all three goals behind visualisation and thus becomes an effective technique (in light of this it is not surprising that persona was the single most cited technique in the interviews).

Reflecting on the role the three reasons to visualise have in the design process, one sees that they have distinct places in various parts of the design process. Creating visualisations to articulate insights helps members of the design team to externalize the results of their sensemaking of the user research (see Krippendorff (1989)), thus creating a common ground (see Clark (1996)) within the design team. This helps the team to define the design space available for the particular project. In other words, the ‘articulating insights’-reason for visualising can be seen as *communication within the design team*.

Service designers also create visualisations with the aim of keeping empathy. This is a way of making sure that the user input is not forgotten throughout the design process. The fact that knowledge collected is forgotten over time has been known for a long time, just like the fact that people tend to remember information which fits their world view better (a classic example is Bartlett’s (1932/1995) experiment with the tale of Native American ghosts). If designers do not keep in touch with user input, there is a risk of ending up with self-centered rather than user-centered design (Pruitt & Adlin, 2006). Thus, being able to remember user data the way it was initially understood is important so that the final designs created always suit the users’ needs and wishes even

in the long run. In other words, the ‘keep empathy’-reason for visualising can be seen as *communication with one’s memory*.

As noted in regard to the influences on the choice of visualisation type, there may be various different types of receivers of information outside the design team (such as clients, workshop participants and authorities). The information directed towards these different groups may also have various aims (aims which can or cannot be met in a single visualisation) – creating and showing visualisation for clients might be a way of showing progress just as well as a way of grounding the design suggestions that are made at a later stage. In other words, the ‘communicate insights’-reason for visualising can be seen as *communication with stakeholders outside the design team*.

Put together, this means that the different visualisations of user research serve the purpose of communicating the information collected, but with different recipients. In fact, Clark (1996, p. 153) states that: “To communicate is, according to its Latin roots, ‘to make common’, to make known within a group of people”. And that is exactly what visualisations do when they translate user research insights into new service designs.

5. Study 2: Analysis of real visualisations

The interview study explored how service designers claim that they visualise the material they have collected in their design research. Study 2 builds on this and investigates what such visualisations actually visualise. Visualisations from real projects were submitted by service design consultancies, and additional examples were collected from selected Internet-sources.

This chapter starts with an introduction to how the data was collected. Section 2 introduces the theoretical frameworks used in this study, followed by a description of the methodology of the study. Thereafter the results are presented. Finally they are discussed in the chapter's final section.

5.1. Data collection

Visualisations were collected via two sources; service design consultancies sharing their material and through creative commons-licensed material available on the Internet.

At the beginning of the study a number of service design consultancies were approached with a question in regard to whether they would be willing to share the visualisations they had produced in projects with their clients. Four consultancies did share their material; two of them had been interviewed for study 1 and two had not been involved in the research process previously.

Additionally visualisations were collected online. The selection criteria for these visualisations were that they had to have originated from service design consultancies and be creative commons licensed. Most were found through the Service Design Tools-website (Tassi, 2009), which explains service design tools with the help of examples submitted by the community.

In total 18 visualisations were used in the analysis.

5.2. Analysis

The analysis started by sorting the visualisations into 6 categories based on similarities in their appearance. The second stage of the analysis was performed in two iterations. The first step consisted of judging each visualisation and the second of creating an overall judgement of each category. Two judges were involved in both iterations. A analysis schema was created for each analysis frameworks (both schema and frameworks are introduced in the next section).

With these schemas as guidance the two judges created one category jointly to establish a common understanding of the scale and criteria. Thereafter they analysed the remaining six categories independently. The results were then added in a joint spreadsheet, after which the second iteration of the analysis was initiated. In the second iteration the two researchers jointly decided on an average result for each category based on their individual analyses of the visualisations.

A description of the types of visualisations in the six categories can be found below, with the number of visualisations in each category:

- » *Category 1: System maps (3)*
- » *Category 2: Personas (3)*
- » *Category 3: Blueprints (4)*
- » *Category 4: Desktop walkthroughs (2)*
- » *Category 5: Customer journeys (3)*
- » *Category 6: Storyboards (2)*

5.3. Analysis frameworks

The study evaluates the visualisations according to four different frameworks. This section introduces the frameworks. A variety of service-related frameworks are used to analyze the material: results from the interview study, the findings by Diana, Pacenti, & Tassi (2009), IHIP and service dominant logic.

5.3.1. Framework: Interview study

The findings from the interview study were used to create a framework for analysis. The visualisations were tested in comparison to the three reasons stated by the interviewees for visualising (see page 45). The three reasons are:

- » To articulate insights
- » To keep empathy
- » To communicate insights to stakeholders

For each of the visualisations a question was formulated, and answered by one of the four alternatives (very high, high, low and very low) :

- » To what degree are insights articulated by the visualisation?
- » To what degree do the visualisations help designers keep up empathy with the users?
- » To what degree are the insights communicated to stakeholders not included in the user research?

The answers were marked in the table presented in Table 5.

Table 5 - Schema for analysis of framework for communicative goals from the interview study

	Very high	High	Low	Very low	n/a
Insight					
Empathy					
Communicate					

5.3.2. Framework: Diana, Pacenti & Tassi

At the same conference as the analysis of the interview study was published, Diana, Pacenti, & Tassi (2009 - republished in an adapted version as Diana, Pacenti, & Tassi (2010)) published their framework (henceforth DPT-framework) for talking about visualisations. They focus on how visualisations (they have however chosen to call them representations) are used within service design no matter where in the design process.

The DPT-framework is built with material used for constructing the servicedesigntools.org website. The DPT-framework consists of two main notions for analyzing visualisations: *iconicity* and *time*. Both are constructed as scales with two contradictory endpoints. *Iconicity* refers to the type of material used in visualisations and whether realistic material (such as photographs) is used or abstractions (such as

symbols and diagrams). The scale goes from realistic to abstract. *Time* refers to whether the visualisation “can give an instantaneous picture of the service – synchronic– or can either visualise the sequence of actions and stages that compose the service experience –diachronic” (Diana, Pacenti, & Tassi, 2009, p. 3).

Diana, Pacenti, & Tassi (2009; 2010) argue that all visualisations can be described along these two scales, represented as two axes, according to which visualisations can be sorted. They find four main types of visualisations. The axes with the four main types of visualisation techniques can be seen in Figure 6.

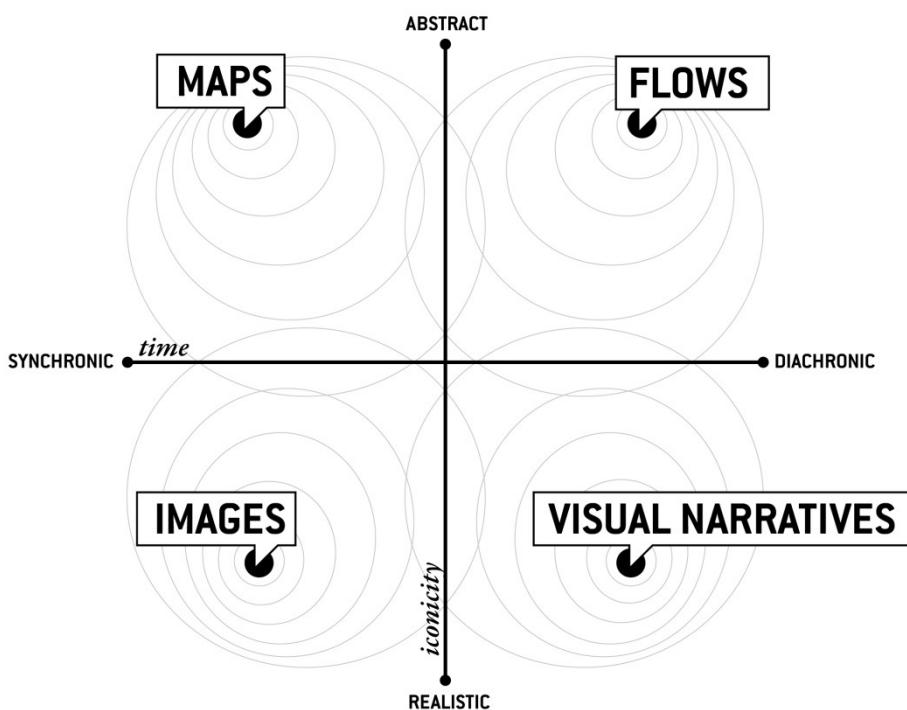


Figure 6 - The two axes time and iconicity visualised together with the four categories of visualisations from Diana, Pacenti & Tassi (2009; 2010). Reprinted with permission.

Diana, Pacenti, & Tassi (2009) provides examples of visualisation techniques belonging to the four general types:

- » *Maps*: system map, mind map, affinity diagrams, service ecologies.
- » *Flows*: blueprint, customer journey map.
- » *Images*: moodboards, service image, evidencing, tomorrow headlines, posters.
- » *Narratives*: storyboarding, filming the interaction, experience prototype, service prototype.

For the analysis one question was formulated for each axis, which the judges answered. The answers to the questions were marked as in Table 6 below. The research questions were formulated as follows:

- » Is the visualisation synchronic or diachronic? And to which degree, fully or mostly?
- » Is the visualisation abstract or realistic? And to which degree, fully or mostly?

Table 6 - Schema for analysis of DPT-framework

	Fully	Mostly	Mostly	Fully	n/a
Time	Synchronic				Diachronic
Iconicity	Abstract				Realistic

5.3.3. Framework: IHIP

The IHIP-framework was introduced in the general background chapter on the development of service theory (see page 7). The framework is, however, somewhat adapted for this study. Three of the four concepts were used here; intangibility, heterogeneity and perishability. But, two adaptations of the framework are made.

First, inseparability was left out of the analysis as it was deemed to be omnipresent or non-present; if the service is produced and consumed simultaneously it will be a part of any visualisation and if the production and consumption are separated the visualisation will show this. Thus it is the nature of the service rather than of the visualisation that decides if a specific visualisation expresses issues of inseparability.

The second adaptation which was done was the addition of tangibility as a point of analysis. This was done since service design has focused much attention on the crafting of the tangible aspects of a service, the so called touchpoints.

Four questions were formulated according to the same pattern: “To which degree does the visualisation represent and express the [service trait] aspects of services”, where service trait is exchanged for each of the four service traits listed in Table 7 below.

Table 7 - Schema for analysis of IHIP-framework

	Very strong	Strong	Weak	Very weak	n/a
Intangibility					
Tangibility					
Heterogeneity					
Perishability					

5.3.4. Framework: Service dominant logic

The S-D logic perspective was introduced as a part of the development of service theory was described in the general background chapter (see page 8). The ten foundational premises of S-D logic, as listed in Vargo & Lusch (2008a), were analysed in regard of their aspects of service delivery. Four out of the ten FPs were found to deal with service delivery, whereas the other six were of a higher level (such as FP1: “Service is the fundamental basis of exchange”). The four FP’s used as a basis for the analysis framework are:

- ”FP4. *Goods are a distribution mechanism for service provision*
 - FP6. *The customer is always a co-creator of value*
 - FP7. *The enterprise cannot deliver value, but only offer value propositions*
 - FP8. *A service-centered view is inherently customer oriented and relational”*
- (Vargo & Lusch, 2008a, p. 7)

These foundational premises were adapted into five research questions (FP8 was split into separate questions for customer orientation and relationships):

- » To what degree is the fact that value is created in use represented? From FP7 and shortened as value-in-use.
- » To what degree is the fact that the value is co-produced⁶ between service provider and service recipient portrayed? From FP6 and shortened as co-production.

⁶ Vargo & Lusch (2008a) use the word co-creation in FP6, whereas co-production is used here. This is to avoid confusion for the expected main audience (service designers) as the word co-creation in service design usually is taken to mean the joint creation of the service structure. When Vargo & Lusch use the word co-creation they mean that the service is produced by the beneficiary and provider jointly as it is used. Somewhat simplified it can be said that what Vargo & Lusch call co-creation service designers would call co-production and the other way around (when Vargo & Lusch say co-production they refer to what service designers would call co-creation).

- » To what degree is the fact that goods function as distribution mechanisms for service portrayed? From FP4 and shortened as goods as distribution.
- » To what degree is the fact that services are customer oriented portrayed? From FP8 and shortened as customer orientation.
- » To what degree is the fact that services are based on relationships between service recipients and employees represented? From FP8 and shortened as relationships.

The questions were answered with one of four options ranging from very strong to very weak and entered into the analysis schema, as in Table 8 below.

Table 8 - Schema for analysis of S-D logic framework

	Very strong	Strong	Weak	Very weak	n/a
Value-in-use					
Co-production					
Goods as distribution					
Customer orientation					
Relationships					

5.4. Results and result discussion

The results from this study are presented according to the different frameworks which have been used. First the data sets are presented in order to highlight the results in the best way possible. Full results are presented in Appendix 3. This is followed by a result discussion for specific issues relating to the individual frameworks. Finally, the overall implications are considered.

5.4.1. Framework: Interview study

The results presented here are the average judgements from the second iteration. The judgements were translated to numbers as follows; Very high = 4, High = 3, Low = 2 and Very low = 1. The diagram is sorted for readability, with the reasons to visualise with lower average numbers in front and the ones with higher average numbers in the back. Figure 7 contains a diagram showing the results from the second iteration for each visualisation technique category and Table 9 provides a tabulation of the numbers used to create the diagram.

Study 2: Analysis of real visualisations

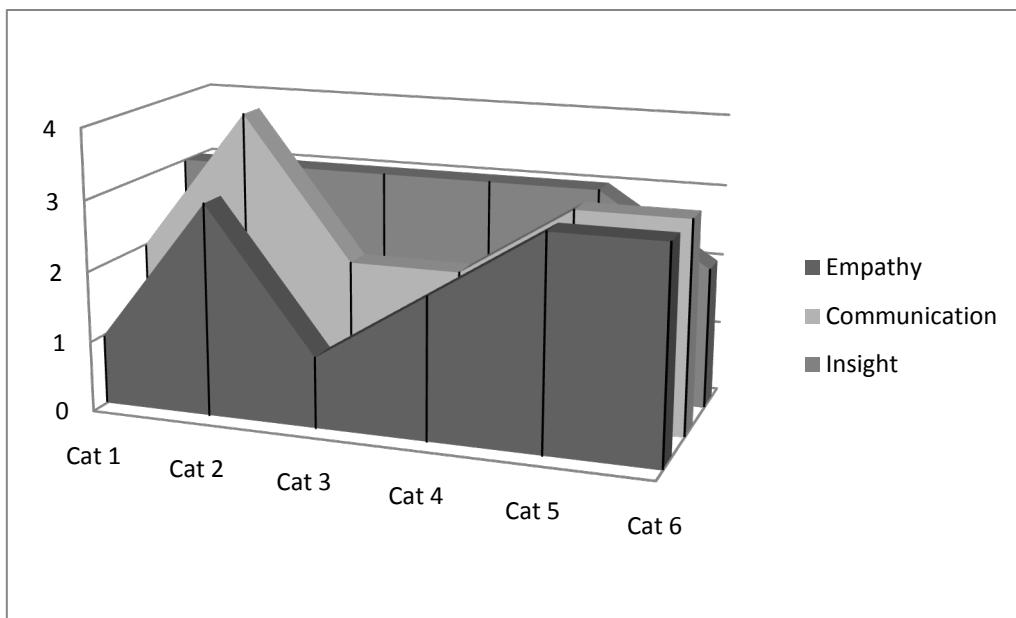


Figure 7 - Diagram of the aggregated judgement for each category on the three reasons to visualise found in study 1.

Table 9 - Tabulation of Figure 7; the aggregated judgement for each category on the three reasons to visualise found in study 1.

	Cat 1	Cat 2	Cat 3	Cat 4	Cat 5	Cat 6
Empathy	1	3	1	2	3	3
Communication	2	4	2	2	3	3
Insight	3	3	3	3	3	2

Figure 7 indicates a clear correspondence between how much empathy a visualisation was judged to contain and how clearly it communicates the interesting aspects of user research. The patterns for the two reasons to visualise follow each other.

Result discussion

The diagram shows that service design visualisations provide a high level of insights. Although the argument for using visualisations to formulate insights wasn't stronger than the other arguments in the interview study (see page 45), this study shows that the visualisations are consistent in communicating insights. It should be noted that the visualisations submitted to the study are selected by companies to show insights gathered. Still, the basis for a visualisation which is finalized and shown to clients will have to be the insights which the designer feels are important. The material thus indicates that insights are the foundation on which visualisations rest.

The two other main reasons to visualise — to keep empathy and to communicate to stakeholders — received more varied appraisals in this study. The appraisals for the two follow each other closely however, but with the communication aspect receives one point higher appraisals in three cases. The somewhat higher judgements for the communication aspect could be a result of the fact that the visualisations originally had been prepared for stakeholders rather than to keep empathy within the team. This conclusion is also supported by interview results (see page 45).

As can be seen in the tabulation of the most commonly mentioned techniques from the interview study (see page 46), there is a connection between the top scoring categories in the interview study and here. The three categories here with the highest average scores in this analysis (both on category and individual level) are personas, customer journeys and storyboard. In the interview study the most cited techniques are customer journeys, narratives (to which storyboards are sorted) and personas. Thus, there is a correspondence between the techniques service designers as a group claim to use the most and the techniques that to the furthest extent deliver on the motives behind creating visualisations.

5.4.2. Framework: Diana, Pacenti & Tassi

Since Diana, Pacenti, & Tassi (2009; 2010) use a matrix to present their results, the analysis of the visualisations built on their framework utilises their matrix as a basis. The matrix from Diana, Pacenti, & Tassi (2009; 2010) has here been adapted to include the results from the analysis. The number of each category has been placed inside the matrix based on the results from the first iteration. To exemplify the analysis the results from Category 1 are presented in Table 10 below:

Table 10 - Results from the individual analysis of each visualisation in category 1 according to the Diana, Pacenti & Tassi (2009) framework.

Category 1		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronous	4	2			Diachronic
Iconicity	Abstract	4	2			Realistic

Judgements were translated to numbers (1, 0.5, -0.5 and -1 respectively) and an average value was calculated. The formula for calculating the average value for the time aspect is thus:

$$\frac{(1 \times n_1) + (0.5 \times n_2) + (-0.5 \times n_3) + (-1 \times n_4)}{N}$$

Study 2: Analysis of real visualisations

Articulating each step along the way the average value would be $((4*1)+(2*0.5))/6 = (4+1)/6 = 5/6 = 0.83$. The marker for the first category is thus placed at 0.83 on the time axis (close to synchronic) and at 0.83 on the iconicity axis (close to abstract). Figure 8 below shows the adapted matrix with the category numbers placed on the points indicated by the analysis. Table 11 gives an overview of the exact average values of the six categories.

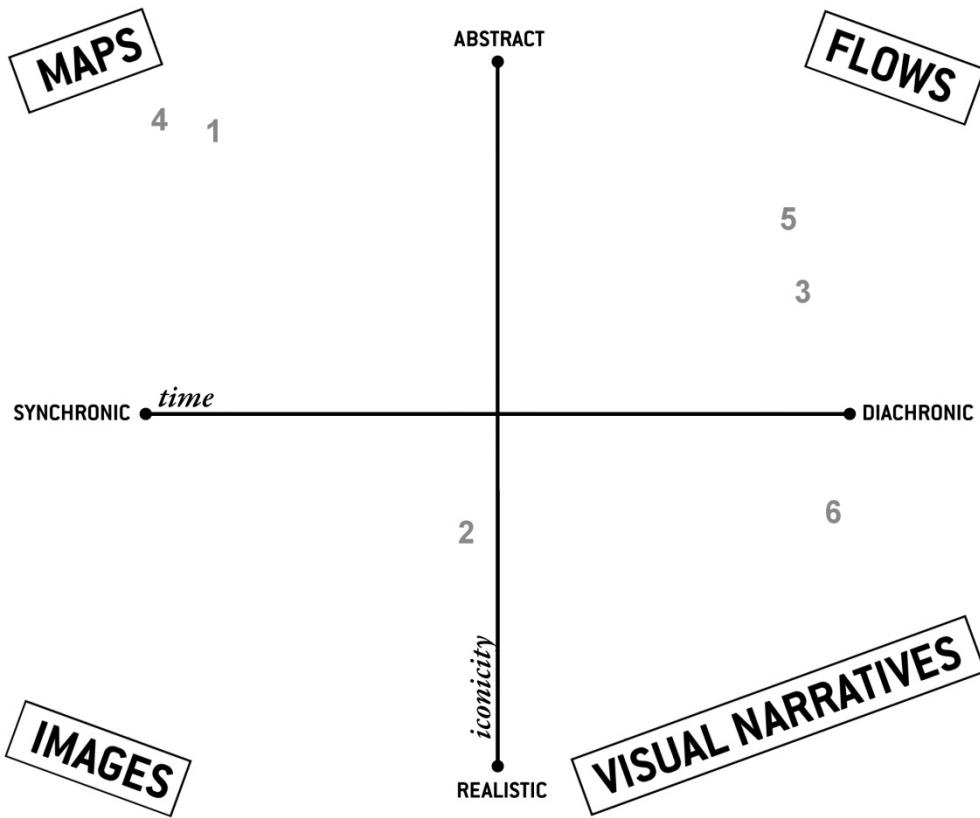


Figure 8 - Model from Diana, Pacenti & Tassi (2009; 2010) adapted to include the placements of the visualisation categories based on the analysis.

Table 11 – Average values of the visualisation categories based on the analysis according to the DPT-framework.

	Cat 1	Cat 2	Cat 3	Cat 4	Cat 5	Cat 6
Time	0.83	0.1	-0.88	1	-0.83	-1
Iconicity	0.83	-0.33	0.38	0.88	0.58	-0.25

Based on the mapping in Figure 8, one can easily create a list of the visualisation techniques analysed according to the four types of visualisation techniques proposed by Diana, Pacenti, & Tassi (2009) (see page 54 for their list):

- » *Maps*: system map, desktop walkthrough.
- » *Flows*: blueprint, customer journey map.
- » *Images*: persona.
- » *Narratives*: storyboard.

Comparing the techniques mentioned by Diana, Pacenti, & Tassi (2009; 2010) as well as those analysed in this study, one finds that four techniques are present in both sources — system map, blueprint, customer journey map and storyboard. All four are placed in the same type by both sources.

Result discussion

Looking at the scale for iconicity, one notices that there is a skew towards abstract visualisations in the available material. An explanation could be that visualisations by their nature already are abstractions of reality, in one way or another. Working with already existing abstractions, designers perhaps also tend to use more of icons, symbols and less realistic materials. The material at hand somewhat supports such a hypothesis as there are several visualisations which could have been created by using more realistic materials as well. This is, however, contradicted by earlier research that shows that designers prefer more realistic material if given the choice (Sleeswijk Visser, 2009).

Scrutinising the material further, it is apparent that the two categories — personas and storyboards — which were judged as mostly realistic also are the same two in which the communication to stakeholders was deemed as more prominent than the insight in the analysis based on the interview study. This is interesting for a variety of reasons; they both belong to the most widely cited techniques. This means that the techniques which provide the most realistic visualisations belong to the favourite techniques of designers (which is supported by Sleeswijk Visser (2009)). Furthermore personas and storyboards are the two techniques in the study that have clear roots outside the service sector. The two visualisations which provide the more realistic visualisations are the two which are the most distinct in their design background, indicating that the complexity of services is leading to that abstractions of reality are preferable as visualisations.

Put together, the analysis points towards a dilemma in visualising services. That is, whereas (service) designers prefer to work with realistic material, services rather lend themselves to being depicted in abstract ways.

5.4.3. Framework: IHIP

The results presented here are the average judgements from the second iteration. The judgements were translated to numbers as follows; Very high = 4, High = 3, Low = 2, Very low = 1 and those judged as not applicable = 0. Figure 9 gives an overview of how the different categories were judged to represent the values of the IHIP-framework. Table 12 presents a tabulation of the data used in Figure 9.

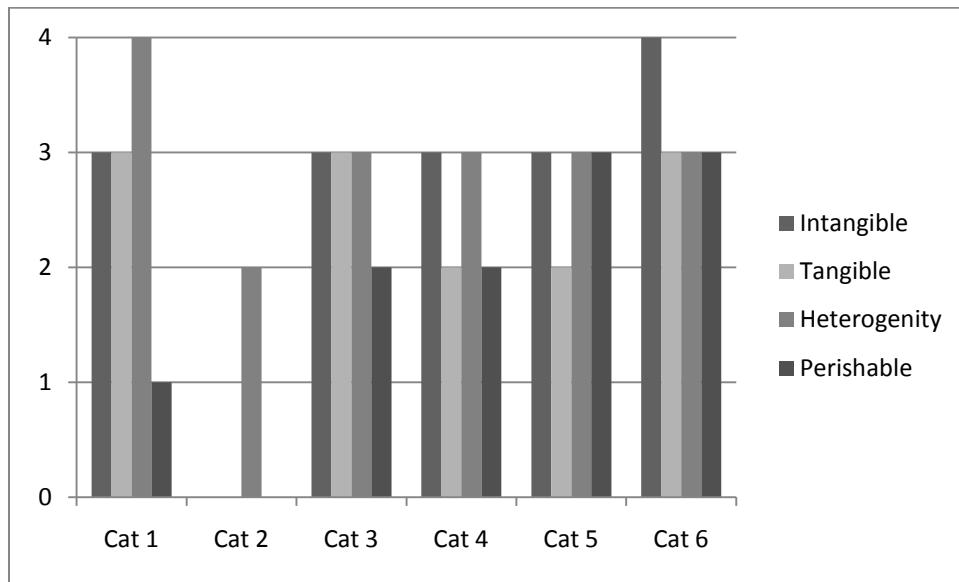


Figure 9 - Results from the second iteration of the analysis of visualisation techniques based on the IHIP-framework.

Table 12 - Tabulation of the data used in Figure 9.

	Cat 1	Cat 2	Cat 3	Cat 4	Cat 5	Cat 6
Intangibility	3	0	3	3	3	4
Tangibility	3	0	3	2	2	3
Heterogeneity	4	2	3	3	3	3
Perishability	1	0	2	2	3	3

Result discussion

Looking at these data one sees that a change of focus from design to services compared to the earlier frameworks yields a different image of the visualisation techniques. Most strikingly, the persona technique which previously was noted as a good design technique now to a large extent is deemed as not being able to express any

of the traits traditionally associated with services. This is due to the fact that persona technique creates an idealized image of the customers, and little in the persona technique per se has to do with the service the persona is created for. Instead, in exploring the service system the persona needs to be used in conjunction with other visualisation techniques.

Interestingly, the other technique which was notable in the design-focused frameworks — storyboarding — again stands out as the only technique which strongly shows all the traits traditionally associated with services. As visualisations are claimed to be chosen depending on the purpose, it can be claimed that all techniques except personas do well when analysed according to the IHIP-framework. They all communicate at least two of the aspects strongly. This is especially true for the intangible aspect, which all techniques communicate strongly.

When the groupings from the DPT-framework are used as a basis for interpreting the data from the IHIP-framework, some additional traits can be added to the descriptions of the groups in the DPT-framework; the two techniques which belong to the Maps-group (system maps [1] and desktop walkthroughs [4]) both communicate the intangible and heterogeneous aspects of services, but are weak in the perishable aspects. Flows (blueprints [3] and customer journeys [5]) on the other hand seem to give a good overview of services. Both techniques score “strong” on 3 traits and “weak” on 1, indicating that they are capable of transferring the fundamental aspects of a service.

5.4.4. Framework: Service dominant logic

The results presented here are the average judgements from the second iteration. The judgements were translated to numbers as follows; Very high = 4, High = 3, Low = 2 and Very low = 1 and those judged as n/a = 0. In Figure 10 the reader can see the results of the second iteration of the analysis in regard to basic values in S-D logic; Table 13 consists of a tabulation of this material.

Study 2: Analysis of real visualisations

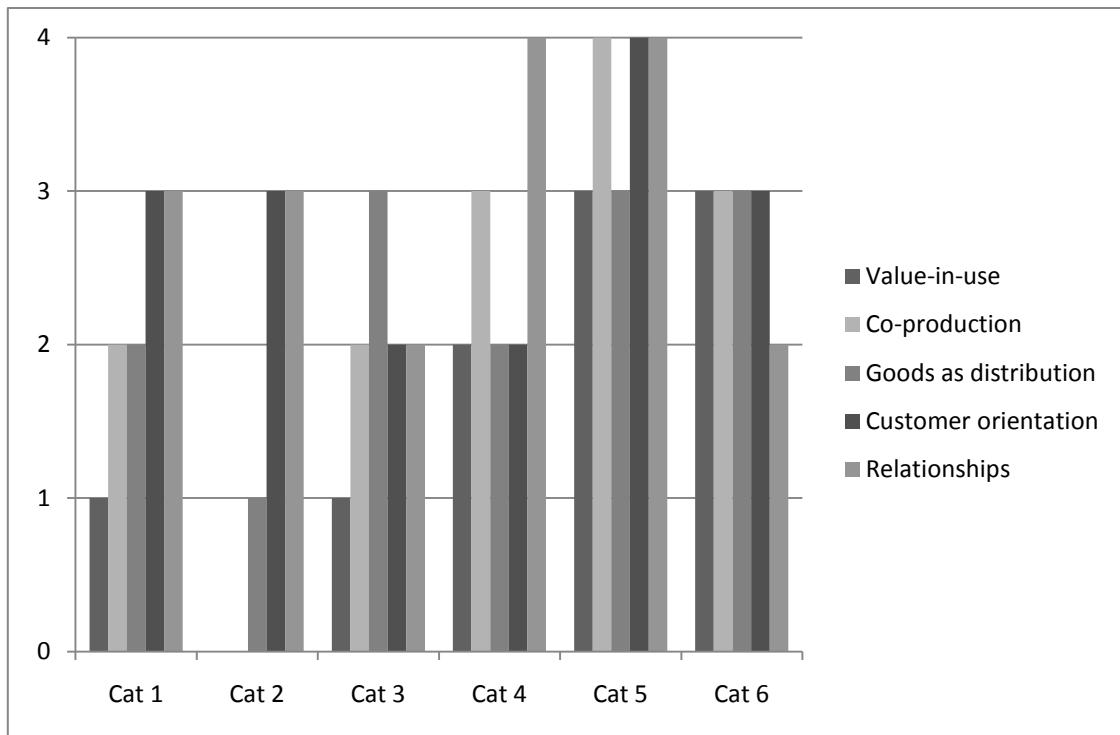


Figure 10 - Results from the second iteration of the analysis of visualisation techniques based on the S-D logic-framework.

Table 13 - Tabulation of the data used in Figure 10.

	Cat 1	Cat 2	Cat 3	Cat 4	Cat 5	Cat 6
Value-in-use	1	0	1	2	3	3
Co-production	2	0	2	3	4	3
Goods as distribution	2	1	3	2	3	3
Customer orientation	3	3	2	2	4	3
Relationships	3	3	2	4	4	2

Result discussion

The analysis according to the S-D logic framework highlights some interesting aspects of service design visualisations. The mantra of the S-D logic, value-in-use, is the aspect which is highlighted the least by the visualisation techniques. In only two techniques – customer journey and storyboarding – the value in use is communicated strongly. This might be due to the fact that the design community to a large extent

focuses on the experience of the service, maybe to such a degree that underlying values are presumed or forgotten.

On the other hand, two of the main changes in the view on how to perform business activities proposed by the S-D logic – customer orientation and a focus on relationships – are supported in a good way by most techniques. In fact, the one technique with only a weak emphasis on the changed business focus is the one which has been adopted from the traditional service research environment without much change; blueprinting. This aligns well with design's traditional focus on the end-users and on the emotions brought about by the design artefact.

In light of these results, the fact that the persona technique once again cannot be applied to certain aspects of the framework is no big surprise. In the areas covered by S-D logic in which design traditionally has its strengths, the persona technique fares well, but it is deemed as not having the possibility to express the business-sides of S-D logic.

5.5. General discussion

Based on the frameworks used to analyse the visualisations collected, some general conclusions can be drawn. Looking at the fundamental aspects of visualisations, it seems that the ability to articulate insights with the help of visualisations is the basis on which visualisations are built. The data also shows a slight skew towards the standpoint that the ability to communicate insights is more important than the ability to create/maintain empathy for the stakeholders. This should, however, be interpreted with caution as the material submitted is likely to originally have been produced to be shown for others than the designers, which would make the skew a result of the material collected rather than being inherent in visualisations. Contextual research from when visualisations are created would be needed to support this suggestion however.

When the results of the analysis based on the framework suggested by Diana, Pacenti, & Tassi (2009) is studied in conjunction with the results from the other frameworks, interesting results emerge. Starting with the time-axis there seems to be a difference in how the fact that goods are used for distribution (from the S-D logic framework) is portrayed; the synchronic visualisation techniques have a weak representation of this whereas the diachronic techniques have a strong representation of goods role as distributors of service. This is due to the fact that it is easier to show the role of the goods (be it as a distribution channel or touchpoint) in the service process in a visualisation which shows how service develops over time (diachronic) than to give an

instantaneous view of service (synchronic). Without a flow, it is difficult to articulate the roles of different components of service.

When attention is directed towards the iconicity-axis, most visualisation techniques belong to the abstract category. This points towards the fact that the nature of services lends itself to be depicted in abstract ways. However, previous knowledge suggests that designers prefer to work with as realistic material as possible for reasons of empathy. Service designers thus need to balance between depicting the complexity of the service and the wish to use as realistic material as possible. Thus a service design visualisation dilemma is identified.

The most popular visualisation techniques (as concluded in the interview study) were compared with the mapping in the DPT-framework, it was found that the two techniques which were deemed as more realistic than abstract both belonged to the top 3 cited in the interview study. The two – storyboarding and personas – are also the two techniques in the study which have the clearest roots within the larger design field.

When analysed from a design perspective the two visualisation techniques received fairly similar appraisals (with personas getting slightly higher appraisals). However, when the two service-frameworks were used the scores were very different. Whereas storyboarding continued to receive high appraisals on most service characteristics, personas were deemed as lacking the traits needed to express five of the nine service characteristics and received low scores on two others. The only two characteristics on which it was deemed as strong were the two which best reflect design's traditional focus; customer orientation and relationships. Thus, from a service perspective the use of personas in isolation seems like a bad decision. This underlines the service design visualisation dilemma identified above. Personas need to be used in conjunction with other techniques which can highlight the service characteristics in a better way – personas should be used to show different ways to interact with the service.

Overall, the analysis of the visualisations according to the service-oriented frameworks highlights the strengths and weaknesses of service design in comparison to service marketing/management. Service design is strong in putting a focus on the customers of the service as well as on the relationships between customers and service providers. In regard to other service characteristics, most visualisation techniques are good at highlighting some aspects and weak at others. This means that service designers need to be conscious of which aspects of services they neglect when they choose a particular visualisation type. There are two exceptions however; both customer journeys and storyboarding communicate eight of the nine characteristics in a strong way.

6. Discussion

This thesis has reported on two studies on visualisations in service design. The first study was based on interviews with practising service designers, whereas the second one consisted of an analysis of visualisations created in real projects. Together the two studies deepen the understanding of visualisations for service design as well as provide arguments in larger scale discussions.

The discussion is divided into sections. The first section summarises the findings of the study. The following sections discusses the implications of these findings in regard to the role of visualisation in service design, how the fields of service design and service management/marketing can approach each other and how the knowledge of visualisations for service design fits in with larger theories of cognition. The chapter ends with a conclusion and suggestions for further research.

6.1. Findings in the thesis

The first study of the thesis aimed at understanding the basic attitudes of service designers in regard to visualisations through interviewing practicing service designers. The interviews found that all interviewees claimed that they use visualisations as a part of their service design process. When asked how they choose visualisation techniques, most claimed to choose technique depending on the audience of the visualisation and the data at hand. It was, however, found that there seems to be a set of standard techniques used by most companies. These techniques are journeys, narratives and personas. These techniques are complemented by the use of media gathered during user studies. Finally it was found that there were three main lines of arguments used by

the interviewees to explain why they visualise; to articulate insights in the material, to keep the empathy with their informants and to communicate the results of their field studies to stakeholders in the design project.

The discussion of the study focused on two aspects; the role of visualisation as an important tool in the user research phase and the communicative aspects of visualisations. Firstly, the visualisations work as a bridge between the insight gathering stage and the later ideation stages of the process, and are a way of ensuring that the user insights are not forgotten as ideation takes over. Secondly, the other aspect in focus of the discussion was the different communicative aspects of a visualisation. It was found that all the different reasons given to visualise could be seen as communication with different recipients. Articulating insights can be seen as communication and sensemaking of the user studies within the design team, whereas visualisations to keep empathy can be seen as communication with one's memory through externalisation. Finally the communication of insights with stakeholders is just what it is called.

The second study explored what service design visualisations actually represent. Four frameworks were used to study six different visualisation techniques. Two of the frameworks were based on research on service design visualisations and two frameworks were based on service marketing/ management efforts in describing services. The results showed that the basis for visualisations is an insight which needs to be communicated. Furthermore it was concluded that the visualisations were better at expressing traits which have traditionally been in focus for design than at expressing traits specific for services. It was also found that some techniques were better at expressing a wide spectrum than others; for the traits traditionally in focus for design persona, customer journey and to some degree storyboard stood out. The service traits customer journey and storyboards were distinctively better at visualising the full spectrum of services than the other techniques.

The discussion of the study highlights interaction effects between the different frameworks and the results found in the interview study. Based on this, a service design visualisation dilemma is identified. The dilemma occurs since a service consists of a chain of events which seems to lend itself to be represented in an abstract way, whereas popular techniques and previous research (Sleeswijk Visser, 2009) suggest that the designers prefer realistic visualisations. The dilemma thus forces the designer into a balancing act; on the one side there is the desire for realistic visualisations, on the other the fact that services seem to be represented easier in an abstract way.

6.2. Visualisations in service design

When combined, the two studies give interesting insights. The very same techniques which were quoted the most in the interview study are also the ones which are deemed to best represent the user research in the analysis of visualisations. Both the customer journey and the storyboard are appraised as being strong or very strong in expressing service traits on most aspects which the frameworks suggest a service design visualisation should contain.

The persona is an interesting special case – when the focus is directed at the design aspects of the visualisations, it is judged as a very strong tool, but when focus is redirected to the service-frameworks, personas are to a large extent unable to represent the characteristics suggested by the frameworks used. It is a strong reminder that service designers need to be aware of the fact that their traditional design tools need to be adapted to the new environment of services (new from a design perspective that is). However, the persona should not be dismissed as a visualisation tool for the above reasons. Designers need to keep in mind that a persona on its own does not communicate anything about the service, just the user of the service. If a persona is not supported by other visualisations, it requires previous knowledge of the service structure from the person viewing the visualisation. In contrast, all other visualisation techniques studied in the analysis of the submitted visualisations will give an uninitiated viewer an idea of the structure of the service.

What should be noted when the two studies are compared, is that there are some differences in the material provided compared to the material mentioned. The most obvious example is that various visualisations aren't based on a single image, — such as scenarios (the introduction of the case in the interlude is an example of a scenario), drama and video — represented about a fifth of the techniques mentioned in the interview study, but not a single example of this was submitted in the second study. Another example is the popularity of techniques, for example the blueprint was only mentioned once but two sources provided blueprints in the second study.

The analysis points towards the fact that the mapping provided by Diana, Pacenti, & Tassi (2009; 2010) can be used as a tool to help service designers in their choice of visualisation technique as there are emerging patterns when combined with the other frameworks of analysis. For example when the group label maps (synchronic and abstract) is appraised according to service traits it is deemed as being strong in highlighting aspects of intangibility, heterogeneity and the relationship between customer and service provider. But it is weak in perishability, the value emerging in use and highlighting the role of goods as a distribution mechanism for services. When compared with the design traits, it is found to be weak on communicating empathy and

insights to stakeholders. The design trait maps are good at communicating insights within the design team.

6.3. Service design and service management/marketing

Raising the level of abstraction from parts of the data to what the data can tell us on a wider scale, this thesis clearly suggests that service design still is more of a design than a service field. As service design (as it is used in this thesis) emerged from the design field, it is not surprising that it is at its strongest in the design aspect. What comes as a surprise, however, is that many of the visualisation techniques struggle to represent even a majority of the service traits suggested by the service marketing/management literature. The designers who form the service design community would probably benefit from approaching the service management/marketing literature and learn of its major findings. This holds especially for the newer theories on services, which is somewhat surprising considering that the S-D logic has received more attention than IHIP in publications from the service design community (see Kimbell (2010), Han (2010) and Wetter Edman (2009) for work on integrating S-D logic with service design).

On the other side of the coin, the research also identifies some aspects on which the visualisations are strong and thus should be able to support service practitioners from other service fields in their work on developing services. The primary contribution of visualisations as produced in service design to service professionals working with an S-D logic frameset is to help visualise customer orientation and the relationships in the service. There is little direct interaction between service design and service marketing/management today, as the two fields have different conferences and publication forums. There are, however, two recent examples of service designers presenting papers at service management/marketing conferences on the use of visualisation in service design (see Segelström, Blomkvist, & Holmlid (2010) and Aebersold, Polaine, & Schäfer (2010)).

6.4. Visualisation and theories of cognition

Relating back to the critique of traditional cognitive psychology put forward by Hutchins (1995) and Gedenryd (1998), this thesis gives support to their respective theories. Both Gedenryd (1998) and Hutchins (1995) argue for a view of cognition in which cognition isn't isolated in the brain, but rather created in interaction with the environment and its artefacts. This view is supported by the interviewees in the first study as they claim that they visualise in order to keep the empathy with the users. That is they externalise the knowledge about users to representations of their perception of the service setting. In using visualisations service designers "carry out

cognitive tasks through making the most of mind, action, and world working in concert” (Gedenryd, 1998, p. 147).

6.5. Conclusion

In conclusion, this thesis has contributed to increase the academic knowledge about visualisations in service design. The interview study provides a description of how service designers report that they use visualisations. It takes the knowledge about the use of visualisations from the previous level of mostly anecdotic to a systematic description. A formalised description provides the possibility to facilitate the introduction of visualisation to new people approaching service design (such as students and clients).

The analysis of visualisations based on frameworks takes the discussion further and identifies the pros and cons of six popular visualisation techniques. The visualisations were appraised in comparison to four different frameworks, two coming from service design and two from service management/marketing. The result shows that the visualisations overall are good at highlighting aspects in which design traditionally has been interested, but struggling in visualising service aspects identified in the service marketing/management literature. This highlights that service design (currently) is a design discipline rather than a service discipline, but it also shows where there are gaps between the two which should be closed if the goal is to create a service discipline combining efforts from design, management, marketing and other fields interested in services.

On a more basic level, the analysis shows in which areas the service design community needs to improve the visualisations in order to represent services more truthfully (given that one accepts the current theories on services). Judging from the appraisals, service design currently sees services as not being goods — a line of thought other service disciplines have discarded the last ten years.

6.5.1. Future research

The research presented gives rise to a number of new research questions. One such is to expand the reach of the second study to include more visualisation types. This would help in identifying more features and lack thereof in the visualisation categories in the Diana, Pacenti, & Tassi (2009; 2010)-model. Furthermore it would provide a good way to highlight differences between different techniques in regard to what they can and cannot visualise. This would also provide material to analyse if there are aspects of visualisations important to service designers not captured in the existing frameworks. Likewise, the visualisations could be studied from specific theoretical angles such as gender studies and political science.

Discussion

The study of visualisations could also be extended in such a way as to widen the understanding by ethnographic efforts studying the growth of new visualisations in research projects. The research at hand has focused on the finalised visualisations, but the interlude hints at further research being needed on many of the visualisation techniques. An example of such research is to create a scientific description of the visualisation techniques, on which improvements of the visualisations can be built.

Such ethnographic studies would also help in building a greater understanding of the service design process as a whole, and should be done in conjunction with an effort to describe the surrounding steps in a service design project. It is thus suggested that a research project be developed which aims at describing the service design process as a continuum, which describes how the different stages in the process interact with each other. To study visualisations of user research in such a project, the researcher thus needs to participate in the user research and continue his/her observations as long as the visualisations are still used in the project.

7. References

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8. Appendix

This section contains the appendixes to the studies presented in the thesis.

8.1. Appendix 1

Below is the full list of questions used during the interview study. Please note that only parts of the questions were analysed for the interview study.

Intro

This interview is a part of the research for my/a PhD project., conducted at LiU, Sweden. The goal of the research conducted within this project is to evaluate the usefulness of various design methods for collecting user data for Service Design. This is done in two steps – the first one is creating a wider understanding of which design methods are being used and service designers' attitudes towards design methods. In the second step service design projects using the various design methods will be observed/conducted with a focus of evaluating the contributions of the various design methods.

Naturally your data will be treated anonymously. The term method is used a synonym for “way of working”.

Background [5 min]

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?

Appendix

The "average" project [15-20 min]

What does your work process in an average project look like?

How much (relative) time do you use for data collection? Do you consider the amount to be enough, too little or too much?

How do you use the data you collect? (How) do you make sure that you connect back to collected data throughout the process?

How is the data collection performed?

How do you present the results of your data collection? Internally as well as externally?

Do you visualise the data you've collected? How?

Do you choose type of visualisation depending on the data you've collected or do you look for certain types of data to be able to fit it in to a preferred way of visualising=

Design methods in practice [15-20 min]

What is your attitude towards specific design methods (like contextual interviews)? Do you consciously use specific design methods in your work or do you tweak several design methods as you think is appropriate?

About how many different design methods would you say that you use regularly?
Which ones?

Which design methods are used when?

Have you evaluated the various design methods you (might) use?
Formally/Informally?

Do you have a favourite method which you think gives extra good results? Which one and what are the objectives with using this method?

Is there any method which you wouldn't use again? (If yes, which one and why)

Who is collecting user data in your projects? Is it the designers who will do the design or other persons (Designers, ethnographers...)

Do you have any more comments surrounding how you use design methods in the field?

Design methods in theory [15 min]

Do you work theoretically with design methods?

Do you ever develop design methods of your own? (How often? More details please)

(How) do you learn new design methods? Papers, conferences...

In which way do you think your academic background influences your choice of methodology? How were design methods treated during your education?

Design methods in comparison to what? [5-X min]

In your opinion, what can design methods contribute with to the design process as a whole?

How important are design methods to service design?

In your opinion, what are you designing?

What is a service according to you?

What is service design according to you?

Could you please talk a bit a project that has made an extra big impact on you? Why did you choose this project? What did you learn from it? How was it performed?

8.2. Appendix 2

Appendix 1 consists of a tabulation of Figure 1. The reasons for visualizing user research which connect to more than one group are placed at the lower end of the table.

Table 14 - List of arguments for using visualizations sorted in categories according to type of reasoning.

Articulate insights	Keep empathy	Communicate insights
Summarize data	Inspiration	Transfer feeling
Present general impression	Create empathy	Transfer insights
Framework for interpreting data	Remember users	Make data accessible
Find patterns	Tell an interesting story	Present insights
Translate data into usable insights	Humanize data	Present research
	Keep data alive	To use in workshops
		Vitalize stories
Capture raw data visually		
Depends on the goal		

8.3. Appendix 3

Below the results from Study 2 are presented in their full form. The presentation order is as follows: On the top level the results are ordered after which framework they have been analysed. Within each framework there are two subcategories – each representing one of the analysis-iterations. Finally within each subcategory the categories are presented one by one.

8.3.1. Study1

Analysis iteration 1

Category 1	Very high	High	Low	Very low	n/a
Insight	1	2	3		
Empathy		1	2	3	
Communicate		1	4	1	

Category 2	Very high	High	Low	Very low	n/a
Insight		4	2		
Empathy	2	4			
Communicate	4	2			

Category 3	Very high	High	Low	Very low	n/a
Insight	2	3	2	1	
Empathy	1	1	1	5	
Communicate	2	2	3	1	

Appendix

<i>Category 4</i>	Very high	High	Low	Very low	n/a
Insight		2	2		
Empathy		2		2	
Communicate		1	3		

<i>Category 5</i>	Very high	High	Low	Very low	n/a
Insight	1	3	2		
Empathy	2	2	1	1	
Communicate	2	2	2		

<i>Category 6</i>	Very high	High	Low	Very low	n/a
Insight		1	3		
Empathy	1	1	1	1	
Communicate	1	1	1	1	

Analysis iteration 2

<i>Category 1</i>	Very high	High	Low	Very low	n/a
Insight		X			
Empathy				X	
Communicate			X		

<i>Category 2</i>	Very high	High	Low	Very low	n/a
Insight		X			
Empathy		X			
Communicate	X				
<hr/>					
<i>Category 3</i>	Very high	High	Low	Very low	n/a
Insight		X			
Empathy				X	
Communicate			X		
<hr/>					
<i>Category 4</i>	Very high	High	Low	Very low	n/a
Insight		X			
Empathy			X		
Communicate			X		
<hr/>					
<i>Category 5</i>	Very high	High	Low	Very low	n/a
Insight		X			
Empathy		X			
Communicate		X			
<hr/>					
<i>Category 6</i>	Very high	High	Low	Very low	n/a
Insight			X		
Empathy		X			
Communicate		X			

Appendix

8.3.2. Diana, Pacenti & Tassi

Analysis iteration 1

<i>Category 1</i>		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronic	4	2			Diachronic
Iconicity	Abstract	4	2			Realistic
<i>Category 2</i>		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronic	2			3	Diachronic 1
Iconicity	Abstract			1	5	Realistic
<i>Category 3</i>		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronic			2	6	Diachronic
Iconicity	Abstract	2	4	2		
<i>Category 4</i>		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronic	4				
Iconicity	Abstract	3	1			Realistic
<i>Category 5</i>		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronic			2	4	Diachronic
Iconicity	Abstract	3	2	1		

<i>Category 6</i>		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronous				4	Diachronic
Iconicity	Abstract		2		2	Realistic
Analysis iteration 2						
<i>Category 1</i>		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronous	X				Diachronic
Iconicity	Abstract	X				Realistic
<i>Category 2</i>		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronous			X		Diachronic
Iconicity	Abstract			X		Realistic
<i>Category 3</i>		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronous				X	Diachronic
Iconicity	Abstract		X			Realistic
<i>Category 4</i>		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronous	X				Diachronic
Iconicity	Abstract	X				Realistic
<i>Category 5</i>		Fully	Mostly	Mostly	Fully	n/a
Time	Synchronous				X	Diachronic
Iconicity	Abstract		X			Realistic

Category 6	Fully	Mostly	Mostly	Fully	n/a
Time	Synchronic			X	Diachronic
Iconicity	Abstract		X		Realistic

8.3.3. IHIP

Analysis iteration 1

Category 1	Very strong	Strong	Weak	Very weak	n/a
Intangibility		3	2		1
Tangibility	1	2	1	2	
Heterogeneity	4	2			
Perishability		1	2	3	

Category 2	Very strong	Strong	Weak	Very weak	n/a
Intangibility	1	1	1	1	2
Tangibility	1	1	1	1	2
Heterogeneity		2	1		3
Perishability					6

Category 3	Very strong	Strong	Weak	Very weak	n/a
Intangibility	2	3		2	1
Tangibility	2	3		1	1
Heterogeneity	2	4	1	1	
Perishability	1	1	2	2	2

<i>Category 4</i>	Very strong	Strong	Weak	Very weak	n/a
Intangibility		2			2
Tangibility	1			1	1
Heterogeneity	2	2			
Perishability		1		1	2

<i>Category 5</i>	Very strong	Strong	Weak	Very weak	n/a
Intangibility	2	2	1	1	
Tangibility	1	1	4		
Heterogeneity	2	3	1		
Perishability	1	4	1		

<i>Category 6</i>	Very strong	Strong	Weak	Very weak	n/a
Intangibility	3		1		
Tangibility	1	1	1	1	
Heterogeneity	2	2			
Perishability		3			1

Analysis iteration 2

<i>Category 1</i>	Very strong	Strong	Weak	Very weak	n/a
Intangibility		X			
Tangibility					
Heterogeneity		X			
Perishability				X	

Appendix

<i>Category 2</i>	Very strong	Strong	Weak	Very weak	n/a
Intangibility					
Tangibility					
Heterogeneity			X		
Perishability				X	

<i>Category 3</i>	Very strong	Strong	Weak	Very weak	n/a
Intangibility		X			
Tangibility		X			
Heterogeneity		X			
Perishability			X		

<i>Category 4</i>	Very strong	Strong	Weak	Very weak	n/a
Intangibility		X			
Tangibility			X		
Heterogeneity		X			
Perishability			X		

<i>Category 5</i>	Very strong	Strong	Weak	Very weak	n/a
Intangibility		X			
Tangibility			X		
Heterogeneity		X			
Perishability			X		

<i>Category 6</i>	Very strong	Strong	Weak	Very weak	n/a
Intangibility	X				
Tangibility		X			
Heterogeneity		X			
Perishability		X			

8.3.4. S-D logic

Analysis iteration 1

<i>Category 1</i>	Very strong	Strong	Weak	Very weak	n/a
Value-in-use			1	5	
Co-production		2	2	2	
Goods as distribution		3	2	1	
Customer orientation		4	1	1	
Relationships	2	2	2		

<i>Category 2</i>	Very strong	Strong	Weak	Very weak	n/a
Value-in-use		1	1	1	3
Co-production			1	1	4
Goods as distribution			1	3	2
Customer orientation	3	2	1		
Relationships		3		1	2

Appendix

<i>Category 3</i>	Very strong	Strong	Weak	Very weak	n/a
Value-in-use	1	1	1	4	1
Co-production	1	2		4	1
Goods as distribution	1	3		2	2
Customer orientation	2		3	2	1
Relationships	2	1	3	2	

<i>Category 4</i>	Very strong	Strong	Weak	Very weak	n/a
Value-in-use		1		1	2
Co-production	2	1		1	
Goods as distribution			1	1	2
Customer orientation		2		1	1
Relationships	3	1			

<i>Category 5</i>	Very strong	Strong	Weak	Very weak	n/a
Value-in-use	2	1	3		
Co-production	4		1	1	
Goods as distribution	2	2	1	1	
Customer orientation	5		1		
Relationships	4	1	1		

Category 6	Very strong	Strong	Weak	Very weak	n/a
Value-in-use	2	1		1	
Co-production	1	2		1	
Goods as distribution	1	1		1	1
Customer orientation	1	1	2		
Relationships	1	1	1		1

Analysis iteration 2

Category 1	Very strong	Strong	Weak	Very weak	n/a
Value-in-use				X	
Co-production			X		
Goods as distribution			X		
Customer orientation		X			
Relationships		X			

Category 2	Very strong	Strong	Weak	Very weak	n/a
Value-in-use				X	
Co-production				X	
Goods as distribution				X	
Customer orientation		X			
Relationships		X			

Appendix

<i>Category 3</i>	Very strong	Strong	Weak	Very weak	n/a
Value-in-use				X	
Co-production			X		
Goods as distribution		X			
Customer orientation			X		
Relationships			X		

<i>Category 4</i>	Very strong	Strong	Weak	Very weak	n/a
Value-in-use			X		
Co-production		X			
Goods as distribution			X		
Customer orientation			X		
Relationships	X				

<i>Category 5</i>	Very strong	Strong	Weak	Very weak	n/a
Value-in-use		X			
Co-production	X				
Goods as distribution		X			
Customer orientation	X				
Relationships	X				

<i>Category 6</i>	Very strong	Strong	Weak	Very weak	n/a
Value-in-use		X			
Co-production		X			
Goods as distribution		X			
Customer orientation		X			
Relationships			X		



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Visualisations in Service Design

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Sammanfattning
Abstract

Service design is a relatively new field which has its roots in the design field, but utilises knowledge from other disciplines focusing on services as well. The service design field can be described as a maturing field. However, much which is considered knowledge in the field is still based on anecdotes rather than research. One such area is visualisations of insights gained throughout the service design process. The goal of this thesis is to provide a scientific base for discussions on visualisations by describing the current use of visualisations and exploring what visualisations communicate. This is done through two different studies.

The first study consists of a series of interviews with practicing service designers. The results show that all interviewees visualise their insights gained throughout the service design process. Further analysis found that there are three main lines of arguments used by the interviewees in regard to why they visualise; as a tool to find insights in the material, to keep empathy with users of the service and to communicate the insights to outside stakeholders.

The second study analysed six visualisation types from actual service design projects by service design consultancies. Four different frameworks were used to analyse what visualisations did, and did not, communicate. Two of the frameworks were based on research in service design; the three reasons to visualise as stated in the interviews in study 1 and a framework for service design visualisations. The two frameworks were adapted from other service disciplines; what differentiates services from goods (the IHIP-framework), and a framework focusing on service as the base for all transactions (Service Dominant Logic). It is found that the visualisation types in general are strong in communicating the design aspects of services, but that they have problems in representing all aspects of service as identified in the service literature.

The thesis provides an academic basis on the use of visualisations in service design. It is concluded that it seems like the service design community currently sees services as being not-goods, a line of thought other service disciplines have discarded the last ten years and replaced with a view of services as the basis for all transactions. The analysis highlights areas where there is a need to improve the visualisations to more accurately represent services.

Nyckelord
Keywords
Visualisation, service design, design, service science

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