Prototyping and enacting services: Lessons learned from human-centered methods

Stefan Holmlid¹, Shelley Evenson²
¹Linköpings universitet
²Carnegie Mellon University

ABSTRACT
In service development, finding new ways to prototype the service experience could potentially contribute to higher quality services, more well-directed service engineering processes, and more. Tools and methods to express important characteristics of a service experience come in many forms, such as personas, blueprints, design objectives, scenarios, and role-playing. In this paper, we propose a conceptual model that informs choices among these options. We draw on experience from the field of interaction design, which has a rich tradition of practice with the methods over the last two decades. The framework is grounded in the analysis work of the field of design from Buchanan (2001). It points toward the transfer of methods between interaction and service design. We also draw out specific characteristics of service experiences, to describe their contribution to an understanding of a future and emerging service experience, from employing the methods in early in the service development process.

Keywords: prototyping, design methods, service design

INTRODUCTION
Although methods for expressing important characteristics of a service has been widely used, the understanding of how these can be used to prototype services is lacking. It is often stated that prototyping a service experience could potentially contribute to higher quality services, more well-directed service engineering processes, etc. In service development processes a range of tools and methods to express important characteristics of a service are used; personas, blueprints, design objectives, scenarios, role-play etc (Shostack, 1984; Evenson, 2005; Zeithaml & Parasuraman, 1990; Holmlid & Evenson, 2006).

Services are complex. The service experience is mediated by people and technology, and is made manifest through a variety of messages, products, performances, and processes co-produced by client(s) and service personnel. During the customer life-time of a service, the overall experience, as well as its constituent parts need to be designed.

A key aspect of design is to systematically use expressive methods to explore a design space, as viewed from the human perspective. Often this means that designers work in collaboration with technology users or customers with different means of prototyping and envisioning the future. Prototyping is also used as a way to define and specify what is supposed to be developed and to test ideas and solutions. In other design fields, such as digital interaction design (see e.g. Houde & Hill, 1997; Ehn & Löwgren, 1997; Arnowitz, Arent & Berger, 2007), the processes for prototyping has been developed as a central part of the practices. With a long history of prototyping (Boehm, 1984; Spinuzzi, 2002) the interaction design field has tried to systematically structure methods and tools for prototyping.

It is our firm belief that human centered methods and the experiences from other design disciplines will contribute to the understanding of prototyping in service development, by providing a framework for usage of the different methods.

EXPERIENCES FROM PROTOTYPING IN HUMAN-CENTERED METHODS
Prototyping within the field of digital interaction design have been under study as a method for producing higher quality IT-systems for more than 20 years (Boehm, Gray & Seewaldt, 1984; Pliskin & Shoval, 1987; Ehn, 1988). Prototypes can be distinguished from each other along several analytic dimensions

In interaction design several different types of *media* has been used for producing prototypes; written scenarios, video, cardboard and paper, software, drama, story boards etc. The different media carry different restrictions. It is, e.g., hard to express exact timing issues when working with cardboard and paper.

Sometimes it is useful to analyze a prototype in terms of *what is represented*, which is often a deliberate choice by a designer. In interaction design it is common to work with, e.g., behavioural as well as structural prototypes. That is, a representation is both a highlighting strategy and a strategy of exclusion. Another classification here is vertical and horizontal prototypes, where vertical prototypes is a deep representation of a focused functionality, such as changing the font. A horizontal prototype on the other hand does not represent all the details of a specific function, but puts the functionality in context and in a goal or task related sequence of actions and activities.

Another dimension often used to discriminate between prototypes is their *degree of fidelity*. The idea on fidelity refers to the fact that a prototype is a representation of something else, and hence can be said to be closer to an "original", or to that which it is representing. Rudd, Stern and Isensee (1996), provide an analysis of the pros and cons of low-fidelity vs high fidelity prototypes in interaction design. They state that low-fidelity prototypes are good to use when a team is trying to identify market and user requirements, whereas high-fidelity prototypes are good to use to create living specifications for programmers and information developers.

A representation also depends on its author in the sense that it is made for a *purpose*. If the prototype is created in order to explore possibilities, or if it is created to test a solution, these purposes will give rise to different prototypes.

Of course, the *timing in a development process* is a central issue when working with prototypes. Prototypes that are explorative and critical contribute in divergent stages of development, while the kind of prototypes that contribute to stages in the process when there is a need to find and establish specifications and definitions are of another kind. van Buskirk & Moroney (2003) discuss the potential of using prototypes in planning, marketing and field support.

Some attempts to present integrated models on prototyping have been suggested. Houde & Hill (1997) presents an integrated model for differentiating between prototypes as artefacts. They differentiate between the role the imagined IT-artifact plays in a user’s life, the look-and-feel of the artefact, and the implementation, that is the construction, of the artefact. Any prototype, they argue, can be positioned within the space that these dimensions span. In their paper they show how different prototypes are used throughout a process, and how they change character in relationship to the three dimensions. They also define what is called integrative prototypes, that tries to capture the whole user experience of a product.

Schneider (1996) and Bäumer, Bischofberger, Lichter & Züllighoven (1996) relates prototyping of interactive systems to software engineering. They highlight the role and the purpose of the prototype. The purposes defined are explorative, to elicit requirements, experimental, to try out technical solutions, and evolutionary, to adapt to a changing environment. The roles defined are presentation prototypes, functional prototypes, breadboards and pilot systems.

Bryan-Kinns and Hamilton (2002) suggests that fidelity, target audience and stage of development are another integrated and workable model of prototypes. They bring forth the
idea that different audiences have different roles in the joint activity of bringing a system to life, and thus bring different perspectives to a prototype, and different interpretations in prototyping. This is especially true for projects that require multi-disciplinary teams for the success of the project, and for systems that are used in multi-disciplinary environments. McCurdy, Connors, Pyrzak, Kaneffsky and Vera (2006), develops these positions further and uses five dimensions to distinguish between prototypes; level of visual refinement, breadth of functionality, depth of functionality, richness of interactivity, and richness of data model. Such a model provides less focus on the fidelity of a prototype, and instead distinguishes between prototypes by the building blocks of a prototype. Holmqvist (2005) on the other hand stresses the difference between a mock-up, and a prototype. He argues that a mock-ups are objects “that have the appearance but not the function of a certain artifact.” (p50). Accordingly prototypes are objects “having the functionality but not the appearance of a finished artifact.” (p50).

While the frameworks and applications described above all refer to design of interactive systems and services, Buchanan (2001) provides a framework for transferring experience between design fields. Buchanan (2001) suggests an analytic framework defining different orders of design that are distinguishable by their primary objects of design. These design objects are signs, products, actions and thought. He also assigned corresponding design disciplines to the design orders which are graphic design, industrial design, interaction design and environmental design, respectively. Buchanan stresses that the design discipline interaction design, not only refers to interaction design with a digital material, but also to the design of other interactions. In a comparative analysis of digital interaction design and service design Holmlid (2007) conclude that they both drive the development of the design order of actions, although digital interaction design tend to emphasize the order of products more, while service design tend to highlight the order of thoughts more. Nevertheless, this points towards the transferability from digital interaction design to service design.

THE SERVICE INTERFACE

Given that services are complex and that they require products, performance, and processes co-produced by client(s) and service personnel, to become real, the range of possible prototypes that can be used is vast.

Service design activities appear throughout a service development process (see e.g. Lovelock & Gummesson, 2004; Moritz, 2005; Evenson, 2005). In these processes service design contribute with a set of modelling techniques for service experiences. Among these modelling techniques can be mentioned service-scape, customer journeys, service interface, etc (Bitner 1992; Moritz, 2005, Zeithaml & Parasutraman 1990; Shostack, 1984; Mager, 2005).

Service design includes all four of Buchanan’s orders of design, and entails human service encounters, as well as technology mediated service encounters. Some examples of the design objects of service design include:

> physical evidence such as a piece of paper with a cue-number, a prescription from a doctor telling the pharmacist that you are allowed to buy a specific medicine or a receipt indicating that you have performed your part as a client by paying for a service.

> technologies that support mediation of service. In self-service banking the web-browser mediates between a person and their funds; at the airport the flight system mediates between the person and their destination; a computer agent mediates the entire selling of a stock when it reaches a prescribed level.

> interpersonal communication mediation occurs in a context which may or may not be a co-located physical setting. A servicescape, as described by Bitner (1992), is a physical setting that provides boundaries or zones meant to encourage or discourage interpersonal communication based on the physical structure such as in an office environment or the
way that furniture and fixtures are structured at a self-service coffee shop. Interpersonal
communications range from the way a company's personnel answer the phone to how a
waiter takes an order in a restaurant. Having a discussion with a customer sales
representative over a telephone is an example where a physical setting is not shared,
where other types of resources for mediation are needed.

> Computer-based agents (such those designed to buy and sell stocks) which mediate
among constituents without any human intervention.

> Information, such as the information on a receipt telling a customer what rules apply if the
 camcorder breaks down.

The mediators listed above are produced in order to achieve and co-produce the
appropriately intended value.

To get an understanding of the service experience it is crucial to “walk in the customer’s
shoes”—to understand and experience the customer journey—just the way a user would.
There are a variety of techniques for documenting and designing such journeys. One could
use process mapping, shadowing, and video ethnography, but what is most important is to
understand all the activities and constraints involved, and to chart out options that might be
needed to be tried later. Gathering quotes from actual customers about their service
experience is one way to highlight problems, opportunities and what people value with a
service. For example, in a museum where a lot of the visitors are children, one should walk
through the museum at the height of a child. When designing a parking service, one needs
to experience the signage to get to the facility as well as the parking meter, or when going
through the process of purchasing a book online, understanding delivery at the door can be
as important to the experiences as the electronic shopping cart.

Understanding the role that people’s expectations play in approaching a service is an
important topic in service research (Zeithaml, Parasuraman, & Berry, 2002). Working with
genres as a framework for design is a powerful technique. Simplified, a genre can be
described as an implicit contract between producer and consumer, directing both the
production process and the expectations of the consumer. For example, in the US there are
several genres in health care delivery, from local clinics to large medical conglomerates.
Explicitly exploring what evidence communicates what attributes within and across the genre
helps in setting expectations at the service encounter. When we can identify clear genres
and the components that differentiate between genres and sub-genres, it provides a base-
line and a model of expectations and efficiency in service design.

Visualizations or models, prototyping, and enactments are crucial to successful service
design. Modeling, prototyping and enacting are closely related to activities in service
development, such as documenting the environment or servicescape (Bitner, 1992),
blueprinting (Shostack, 1984), and defining touchpoints (Zeithaml, Parasuraman, & Berry,
2002). Modeling, prototyping and enacting in service design draws on the broader arts (such
as Drama) as well as communication, industrial and interaction design.

DISCUSSING SERVICES PROTOTYPING

Even though service design and interaction design are similar, some of the methods
described in the literature are more powerful than others. In the following we will describe
methods based on performative experience, narrative documentation, and enactment.

Sometimes services are viewed as an experience co-created by the customer and the
service organization. One prototyping method described by Bucheneau and Fulton Suri
(2000), Experience prototyping, tries to answer up to the demands of this. They describe it
as a way of prototyping where the client, user and designer experience the experience of the
future situation, rather than watching a demonstration of the experience. They also claim
Experience prototyping to be an attitude that allows the designer to prototype an “integrated experience, rather than one or more specific artefacts”. Danholt (2005) describes a similar approach, complementing traditional ways of viewing prototypes (see e.g. Floyd, 1984; Bödker, 1998) with the notion of performativ. In his writing a central activity of prototyping is to let future technology users use the prototype. Such usage is transformative both for the technology and the user. Users are trying to figure out the purpose and the operation of the prototype, whereas the designer tries to figure out the requirements and experience of the user. In this sense prototyping is a co-constructive activity, in which several actors participate and are in the midst of. Both of these acknowledge that the artefacts used to embody a service are only a part of the actual service experience.

Given that a service is unfolding over a period of time, documentary methods such as video documentaries, cultural probes and diaries are effective means of co-creating an understanding of a service experience. Cultural probes (Gaver & Dunne, 1999) are a way of letting users self document experiences and details of an experience, and at the same time conveying values and needs normally disclosed in prototyping sessions. A diary (Lindström, Ståhl, Höök, Sundström, Laaksolahi, Combetto, Taylor and Bresin, 2006) is yet another way of collecting such information. Video documentaries (Raijmakers, Gaver and Bishay, 2006) allows for a user to express and document a service experience in her own pace, and her own choosing. Such video documentaries can then be used in a design process using other video based methods (Mackay, Ratzer & Jencek, 2000). Bardram, Lykke-Olsen and Madsen (2002) suggest that video scenarios can be developed using blue-screen technology, to allow for narration of scenarios with technology and solutions that can only be simulated with the help of computers, still allowing for users enacting the scenarios.

Modeling what happens, how people act, in what order things happen and coordination of back-stage and front-stage activities can be also be done through scenarios. Story-boards are created as a narration, often in the form of comic strips, to describe the activities of a particular stakeholder (or persona) in the service process. In the generative stages of the design process, enabling users to illustrate, narrate and choreograph their ideal scenario, highlights solutions and design objectives and often leads to service innovation. When expressing their ideal scenario in this way, people embed the value they want from a service, at the same time they express how it will fit it into their activities, lifestyle, and fulfill their goals.

A service experience is seldom solely depending on a single person. Therefore, role playing and other dramaturgic methods are effective to suggest solutions, provide inspiration and test alternatives, etc. Working with dramaturgic methods allows designers and users to enact or perform service experiences before they have been established in an organization. By doing that, anomalies and alternative solutions can be found. Iacucci, Kuutti & Ranta (2000) and Iacucci, Iacucci & Kuutti (2002) suggest Situated and Participative Enactment of Scenarios (SPES) as a method to allow for both scripted role-playing and in situ enactment of solutions. One similar approach is suggested by Brandt & Gunnet, who suggests that staged performances and dramaturgic props can be used to explore and test service experiences. Furthermore, Burns (1994) suggests that bodystorming can be used to enact scenarios with simple mock-ups, to generate design suggestions, rather than evaluating them. Howard, Carrol, Murphy and Peck (2002) further develops the idea of the props used in such enactment. They suggest that the users, in a scenario setting, will come up with design solutions based on “endowed props”.

In all if these approaches the prototyping of the experience as well as the touchpoints is an integrated part. Such prototypes can range from rough sketches of “moments of truth”, to full scale brick and mortar facilities (Edvardsson, Gustafsson, Johnson, Sandén, 2000). Creating cultural probes can also be effective in capturing a wider array of concerns from customers.
For example, with a technology probe a customer provided with a white box to achieve her goals. In doing so she inscribes the service concept and behavior in the white box, and distinguishes between parts of the service concept that she believes can be performed through technology and parts that may need a human touchpoint.

A suggestion for service design prototyping

Given that service design activities appear throughout a service development process a crucial dimension to use to increase understanding and the role of prototyping is at what stage in the generic service design process a prototyping method is used.

In the early stages of the service design process and supported by exploratory and generative participant research, the goal is to expand a team’s thinking or perspective on the service innovation opportunity.

At this point in the process, the aim is to form an understanding of and a vision from the different actors in a service performance, techniques that highlight the perspectives of the different actors in different ways are preferred. It is also preferred that the methods used invite actors to participate in prototyping, and that they are easily built and redesigned. The general mode of inquiry should be divergent, and trying out alternatives. The methods that can be used range from different forms of ethnographic methods to pure observational methods. When specifically looking at expressive methods, techniques such as customer journeys and blueprinting provide insight into the current activities, relationships and mediating technologies. Using generative methods such as journaling and having participants draw their experience is also useful. Focusing on touch-points brings perspective into the service evidence and manifestations of moments of truth. Developing stakeholder maps and designing personas brings insights on the range of possible actors that need to participate in a service performance, and their values and goals.

During Modeling, where the aim is to form a coherent vision and to gather support for some of the structuring principles and central ideas, the need to engage people, to communicate and involve the in decision making is central. The general mode of inquiry should be transformative, and provide coherent visions and alternative solutions. Scenarios, storyboards, touch-points, role-play, enactments and personas can be used to explore and interpret suggested solutions.

When Defining requirements, where the aim is to create the specifications that define the goals of the development projects, there is a need to formalize and provide detailed models, as well as finding ways of communicating with the different teams that are formed to take care of the development projects. The primary mode of inquiry here is convergent. Blueprints, scenarios, design objectives, enactments and scripts can be used to create shared understanding and reference for what the end-goal of the development process should produce, as well as to provide basis for interpretation and specified requirements.

The perspective, coverage and granularity of the different methods during the different stages differ, as does the reason to use them. Providing an increased understanding of methods for prototyping services based on theories and experiences from other design fields will increase the possibilities of effective development of high-quality services.

CONCLUDING REMARKS

We suggest that prototyping methods for services should be chosen according to the particular stage in the service development process. Once appropriate to stage, the purpose is the next consideration. That is, do the prototypes serve as an aid to divergent thinking, convergent thinking, an evaluative purpose, or some other purpose?
With a clear position regarding stage an purpose the design team, stakeholders and service audience representatives that will participate in the prototyping activities need to be engaged in enacting, developing and evaluating the prototypes in different media.

REFERENCES


