

INTERACTION DESIGN AND SERVICE DESIGN: EXPANDING A COMPARISON OF DESIGN DISCIPLINES.

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While product design and interaction design are establishing themselves as ordinary practices, service design is still largely not well understood. Moreover, interactive artefacts are being introduced into service settings in a larger degree than before. We tend to rely on these artefacts as one, or sometimes the sole, possibility to do banking, to declare our taxes, etc.

In this paper we seek to identify common ground and differentiation in order to create supportive structures between interaction design and service design. The analysis relies on two frameworks, one provided by Buchanan, defining orders of design, and one provided by Edeholt and Löwgren, providing a comparative framework between design disciplines.

The framework of Edeholt & Löwgren is amended through the comparison, to include service design. Comparative dimensions added pertains to all areas of Edeholt & Löwgren's framework; Design process, design material and deliverable.

INTRODUCTION

Interaction design encounters service design in business innovation, e-government, and a whole range of other settings. There is a range of service settings in which interactive artefacts are used to perform service, and a set of business innovation strategies combining process innovation and interactive technology. In the meeting between these the service perspective becomes a challenge to interaction design, and technology usage becomes a challenge to service design. For design to work in an integrated manner in such situations, designers need to have an understanding of each other's disciplines. By comparing the design disciplines according to dimensions of a small set of areas, we will in this paper provide a basis to share understanding, create common ground and identify differentiation. First, service design will be explained briefly, then three perspectives will be introduced to set a framework for the comparison. In the second section the actual comparative analysis will be made, and in the third section the results will be discussed and in the fourth section the conclusions presented.

Service design

Service design is, in contrast to service development, described as a human-centered approach and an outside-in perspective (Mager, 2004; Holmlid & Evenson, 2006). It is concerned with systematically applying design methodology and principles to the design of services (Bruce & Bessant, 2002; Holmlid & Evenson, 2006). Service design integrates the possibilities and means to

perform a service with such qualities, within the economy and strategic development of an organization. A service designer can “visualise, express and choreograph what other people can’t see, envisage solutions that do not yet exist, observe and interpret needs and behaviours and transform them into possible service futures, and express and evaluate, in the language of experiences, the quality of design” (Service Design Network, 2005).

As a discipline, service design should not be viewed in isolation, but in the context of service development, management, operations and marketing (Edvardsson, Gustafsson & Roos, 2005; Mager, 2005; Edvardsson, Gustafsson, Johnson & Sandén, 2000). Together these form the provisions for good service performance. User orientation, contextualization and other service development challenges are at the heart of service design (Holmlid, 2004; Edvardsson, Gustafsson, Johnson & Sandén, 2000; Kristensson, Gustafsson & Archer, 2004; Bruce & Bessant, 2002).

Service design activities appear throughout a service development process (see e.g. Lovelock & Gummesson, 2004; Moritz, 2005; Dahlbom, 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 55; Moritz, 2005, Zeithaml & Parasutraman 1990; Shostack, 1984; Mager, 2005).

Design disciplines and areas

Buchanan (2001) defines four orders of design. They are distinguished by their design object. The design objects are signs, products, actions and thought. The corresponding design disciplines are graphic design, industrial design, interaction design, and environmental design. In classical Swedish design theory the classification finds support from Paulsson & Paulsson (1957), as well as Hård af Segerstad (1957). Hård af Segerstad states

“Artefacts around us function with maximum effect, only when they are appropriately organized into a total milieu.” Hård af Segerstad (1957), p 38 auth. transl.

Interactive artefacts

The field of human-computer interaction, HCI, have had a rapid development during the last 40 years. Beginning as a field mainly developing general theories, based on concepts from cognitive psychology,

it has developed into a multi-disciplinary field (see e.g. Ehn & Löwgren, 1997), which is similar to the development described by Findeli & Bousbaki (2005). HCI developed from the general theory focus over a product focus into a focus on subjectivity and contextuality (see e.g. Bannon & Bodker, 1991, Kyng & Mathiassen, 1997).

During the last two decades design has become an important perspective within the methods- and experience-movements of user-centred systems development. Interaction design and experience design were established during the 90’s, and have gained ground within user-centred design, UCD, practices. As of today, they have reached a level of integration where it is hard to tell whether they can or should be regarded as separate design disciplines.

As a result of these developments, the rapid development of WWW with its focus on community and experience, and divergence such as ubiquitous computing, UbiComp, mobility, tangible interaction etc. interaction design has established itself as one of the main user-centered design disciplines.

With the advent of the UbiComp movement and the current development of mobile and wearable computing, interaction design has become a discipline that not only has to relate to system development, but also has to relate to product design and development (Edeholt & Löwgren, 2003).

Edeholt & Löwgren (2003) compare interaction and industrial design to highlight the challenge that design for ubiquitous computing poses to the two areas. The basis for the challenge is that ubiquitous computing comprises both tangible and virtual material, both spatial and temporal dimensionality, and both visual and experiential aesthetic qualities.

The radical design movement, e.g. as practiced at RCA (Gaver & Martin, 2000; Dunne, 1999), focus on other aspects than the interaction with technology as such, which have been the primary focus for interaction design. To them, and to some game design, friction, ambiguity and the physical product can be a central part of a concept. The radical design movement use design as part of an aesthetic, cultural and technological research discourse.

Furthermore, Dahlbom (Dahlbom, 2005; Dahlbom, 2003) argues that the basis for information systems development is shifting from systems to services, from factory to market, from processes to situations, from improvement to innovation. Dahlbom argues that the important aspects of these services will not be those concerned with service processes. Instead, the important

aspects are the ones that are related to the design of the delivery of services, henceforth referred to as servuction (Edvardsson & Thomasson, 1991), rather than the organization of services.

Preliminaries

The framework used by Edeholt & Löwgren was devised to analytically highlight the character of interaction and product design, when challenged by the combined tangible and intangible aspects of UbiComp (Edeholt & Löwgren, 2003).

Based on the three perspectives, services, design disciplines, and interaction design, we can state some preliminaries; that interaction design from Buchanan's (2001) model is more than interaction design with the digital material, that proponents of the information systems area identify a shift in perspective towards services, and that interaction design with the digital material is constantly being integrated with other areas. To differentiate between Buchanan's interaction design and interaction design with digital material, the former will be called Interaction Design, and the latter will be called IxD.

Moreover, for interaction design with the digital material the compilation of Buchanan (2001) and Dahlbom (2005, 2003), highlights the importance of understanding service design and interaction design with the digital material in relationship to each other. Edeholt & Löwgren (2003) provide a comparison *between* design orders, but the review of the perspectives above call for a comparison of design disciplines *within* a design order. From Buchanan's (2001) point of view service design and IxD both are within the Interaction Design order.

Understanding how IxD and service design differs and relates to one another would allow us to better accommodate and acknowledge the different disciplines' possible influences on each other. From a professional design perspective this will provide a starting point to discuss and build a repertoire for interaction and service designers to understand what a service design problem is and what an IxD problem is. This paper is a starting point for that, an attempt to highlight some important aspects.

ANALYSIS

The comparison will be made primarily between interaction and service design. The comparison will be performed relying on the framework presented in Edeholt & Löwgren (2003), where they compare industrial design and IxD. They identified three general

areas as an analytic framework for this comparison: process, material and deliverable. As a coarse model for comparison it is supported by other approaches, such as (Buchanan, 2001; Lilienthal & Züllighoven, 1997; Rosenman & Gero, 1998) and several others.

Edeholt & Löwgren (2003) use the term industrial design to refer to the design of goods, rather than letting industrial refer to the conditions under which the design process is established. This definition is in accordance with the framework suggested by Buchanan (2001).

The statements on interaction and industrial design included below is gathered from Edeholt & Löwgren (2003), and when needed enhanced with an analysis that relates to service design. *Statements* from Edeholt & Löwgren, **new** statements and additions are distinguished from each other, through the indicated typographical conventions. The scale used in the comparison is the scale used by Edeholt & Löwgren. It uses the terms *highly*, *somewhat*, and *not significantly*. The presentation will be structured according to the three analytic areas Process, Material and Deliverable (Edeholt & Löwgren, 2003).

THE PROCESS AREA

See figure 1 for a summary of the dimensions for the Process area.

Design process [explorative, analytical]

Service design is a discipline that is influential in innovation processes, in business and technology development, as well as in deployment of e.g. technology (Moritz, 2005). With a process that covers so many aspects it would be easy to say that it is explorative as well as analytical. Depending on where in the process one situates the analysis one would find that one is more prevalent than the other, one is more needed than the other to drive the process. At the time being, it is one of the main ideas behind service design, that one should be open to both problem reframing and changing solutions. The service design processes drive and support divergence, convergence as well as selection.

- > **Service design processes are highly explorative, and somewhat analytical**
- > *Industrial design processes are highly explorative, and somewhat analytical (Edeholt & Löwgren, 2003)*
- > *Interaction design processes are not significantly explorative, and highly analytical (Edeholt & Löwgren, 2003)*

Design representation [depictive, symbolic, **enactive**]

Representations used in the service design process

include drama, scenario, storyboard sketching, service interface analysis, etc. (see e.g. Shostack, 1984; 1987; Kalakota & Robinson, 2004; Moritz, 2005, Holmlid & Evenson, 2007). Depending on who uses the representation for a specific purpose their nature will shift between depictive and symbolic. A storyboard, e.g., will only show a specific perspective of a service process, which from that perspective will be depictive, but from other perspectives will be symbolic. As service design often deal with physical space, goods and products as part of the service process, models, sketches etc are frequently used. Moreover, service design representations often are enacted, such as when using dramaturgy or choreography to represent the service process. Service design representations are highly enactive, somewhat depictive and highly symbolic.

Recent research (Arvola & Artman, 2006, 2007) show that IxD representations are not enough depictive in relationship to some of the dynamic material aspects, which results in that designers use enactive representations to compensate for this. Industrial design representations support an experiential relationship to the designed object but this can hardly qualify them as being enacted representations.

- > **Service design representations are somewhat depictive and highly symbolic, and highly enactive**
- > *Industrial design representations are highly depictive, not significantly symbolic (Edeholt & Löwgren, 2003), and not significantly enactive*
- > *Interaction design representations are not significantly depictive, highly symbolic (Edeholt & Löwgren, 2003), and somewhat enactive*

Production process [physical, virtual, ongoing]

What sets services apart the most from the perspective of Edeholt and Löwgren (2003), is that they focus on artefacts. A service is not an artefact in the sense they use the word. A service often is composed of ready-made artefacts, inventory, IT-systems, artefacts produced during the process, the meeting as such, etc. The distinction between production, manufacture and distribution is not clear-cut for services. While Edeholt and Löwgren (2003) assume that there actually is an artefact à-priori, for service design the artefacts of the service are produced during the servuction. In some sense it is in itself a physical production process, where the client is a co-producer involved in the larger value-adding process. But, instead of giving the physical process a wider meaning, we will refer to this as an ongoing production process. This leaves the concepts

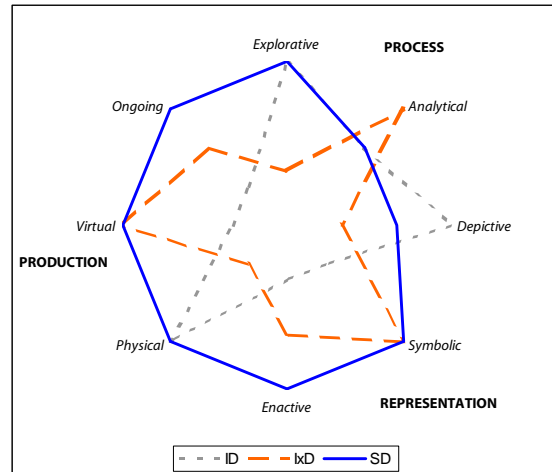


Figure 1. The dimensions of the Process area

from Edeholt and Löwgren (2003) untouched, that is, that they refer to the production processes before the usage or consumption. For a service this will mean that the physical process will refer to goods and products, while the virtual process will refer to software, manuscripts etc.

For IxD the concept of an ongoing production process is valuable to point towards the immateriality of the artefact, and the focus that IxD has on usage, as well as e.g. end-user created content. This relates to a contemporary discussion within IxD theory, where the idea of the existence of an IxD artefact and the idea of the use of the IxD artefact are frequently discussed (Hallnäs & Redström, 2002; Holmlid, 2002). Moreover, the concept of an ongoing production process should not be mistaken as continuous quality development.

- > **Service design production is highly physical, highly virtual, and highly ongoing**
- > *Industrial design production is highly physical, not significantly virtual (Edeholt & Löwgren, 2003), and not significantly ongoing*
- > *Interaction design production is not significantly physical, highly virtual (Edeholt & Löwgren, 2003), and somewhat ongoing*

THE MATERIAL AREA

See figure 2 for a summary of the dimensions for the Material area.

Material [tangible, virtual]

Following the same argument as service design production, the material that services are made of, can be both tangible and non-tangible. In service design it is essential to establish service evidence, and to have a clear service interface, but also to have software, manuscripts and other virtual material (Mager, 2004; Moritz, 2005; Zeithaml & Parasuraman, 1990).

- > **Service design materials are highly tangible and highly virtual**
- > *Industrial design materials are highly tangible, and not significantly virtual (Edeholt & Löwgren, 2003)*
- > *Interaction design materials are not significantly tangible, and highly virtual (Edeholt & Löwgren, 2003)*

Dimensionality [spatial, temporal, **social**]

Again, the specifics of services play an important role for dimensionality. A service is always produced in a social and physical setting. Adding a social dimensioning finds support from design theory (Hård af Segerstad, 1957; Paulsson & Paulsson, 1957). How the physical environment is layed out can be of major importance for the service. Moreover, a service is temporal in its nature. It is hard to imagine a service that does not unfold over time. For Edeholt & Löwgren, temporal dimensionality entails concepts such as story and interaction, but there is a tendency (which will be more noticeable when the aesthetic criterion is analysed) to neglect the social aspects. Services always have a social (or relational) dimension. The most basic services are tasks performed by someone for someone else, while in more complex service settings there are chains of dependencies not always visible or legible for the customer. In service design there are direct customer related service encounters and service interfaces on-stage, and there are other service encounters and service interfaces back-stage, beyond the line of visibility (Shostack, 1984; Shostack, 1987). Some IxD is also concerned with the social dimension, but far from all is, while industrial design seldom directly extends into social space.

- > **Service design dimensionality is somewhat spatial, highly temporal, and highly social**
- > *Industrial design dimensionality is highly spatial, not significantly temporal (Edeholt & Löwgren, 2003), and not significantly social*
- > *Interaction design dimensionality is not significantly spatial, highly temporal (Edeholt & Löwgren, 2003), and somewhat social*

Aesthetic focus [visual, experiential, **active**]

A service is mainly experienced as it is consumed or used. In that sense the aesthetic focus is experiential. But, within that service there are products and goods that contribute to the aesthetics of the service, which rely on visual aesthetics, e.g. the way a clerk at the bank is dressed. Moreover, the aesthetics of a service is created and re-negotiated as the service unfolds in a co-creative manner. Therefore there need to be an

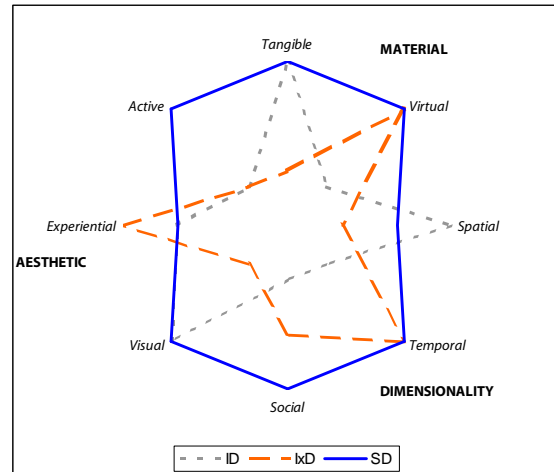


Figure 2. The dimensions of the Material area

aesthetics of activity for services (Maffei, Mager & Sangiorgi, 2005; Holmlid, 2002).

In contrast to the experiential aesthetics, that is strongly related to technology usage, and thus directs the attention towards the relationship between the human and the computer, or even directs the human attention towards the computer, an aesthetic focus which is active, re-establish the social relationship between the human agents in the service process.

- > **Service design aesthetics are somewhat experiential, highly visual, and highly active**
- > *Industrial design aesthetics are highly visual, somewhat experiential (Edeholt & Löwgren, 2003), and not significantly active*
- > *Interaction design aesthetics are not significantly visual, highly experiential (Edeholt & Löwgren, 2003), and not significantly active*

THE AREA DELIVERABLE

See figure 3 for a summary of the dimensions for the Deliverable area.

Scope of deliverable [product, use, **performance**]

This follows from several of the other points above. The main deliverable of service design is based in a temporal structure where the experience of participation, action and contribution is at centre stage, but there will be artefacts and products embedded in this activity that are central for the experience of the service. To make this perspective justice one would need to find a way to qualify the scope with respect to the customer, as well as the customer's customer. For service design the customer's customer is as important as the customer, while for interaction and industrial design, the customer is more important than the customer's customer. This difference is captured with adding performance (as in a performance) to the concept of use

- > **Service design deliverable scope is somewhat product, highly use, highly performance**
- > *Industrial design deliverable scope is highly product, somewhat use (Edeholt & Löwgren, 2003), not significantly performance*
- > *Interaction design deliverable scope is not significantly product, highly use (Edeholt & Löwgren, 2003), not significantly performance*

Flexibility of deliverable [final, customisable, **dynamic**]

A service design deliverable is final, or static, in the sense that when the service is over, it cannot be revoked or changed. For a service customer getting a service once, the service is static, but over time the service can be highly customisable. Given that the service design is not finished until the service is performed, there is a high degree of dynamicity in the deliverable. This dynamicity is not at all present in an industrial design deliverable, and only to some degree in an IxD deliverable. The difference is that for IxD the dynamics are preset through, e.g. limited number of ways to perform an action, but in service design the dynamics are based on pre-established possibilities of action paired with human judgment in a situation.

- > **Service design deliverables are somewhat final, highly customizable, and highly dynamic.**
- > *Industrial design deliverables are highly final, not significantly customisable (Edeholt & Löwgren, 2003), and not significantly dynamic*
- > *Interaction design deliverables are somewhat final, somewhat customisable (Edeholt & Löwgren, 2003), and somewhat dynamic*

Customer for deliverable [mass market, organizational support, **customer's customer**]

Services are as common on a mass-market, as they are performed as bespoke or contracting work for specific and known customers.

What is more important is that the deliverable from a service design point of view often is as influential for the customer's customer, and her experience of the service, as it is important for the customers possibilities to give high quality service. In industrial design as well as IxD, the concept of the user entails such notions, but viewed as the customer's customer it is only somewhat important

- > **Service design customers are highly mass-market, highly organizational support, and highly customer's customer**
- > *Industrial design customers are highly mass market, and not significantly organizational support*

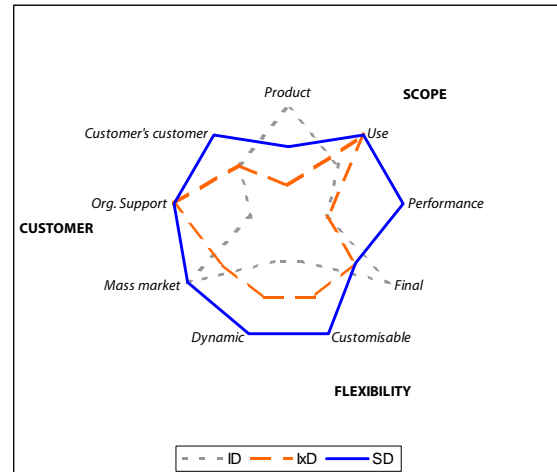


Figure 3. The dimensions of the Deliverable area

(Edeholt & Löwgren, 2003), **and somewhat customer's customer**

- > *Interaction design customers are somewhat mass market, and highly organizational support (Edeholt & Löwgren, 2003), and somewhat customer's customer*

DISCUSSION

In Buchanan's (2001) framework the wider orders of design would include the detailed orders. The deviations from this are some aspects of the design representation, the design dimensionality, the flexibility of the deliverable, and the scope of the deliverable. Given Buchanan's (2001) framework the strong relationship between service design and industrial design was expected.

Two reflections will be made here. The deviation in design dimensionality is an effect of the definition of *spatial* in Edeholt & Löwgren (2003). It refers to a micro-spatiality that is important for products, that is the space on the product. For service design the kind of spatiality that makes the most difference is at a macro-level. The deviation in flexibility of deliverable is an effect of the definition of *final* in Edeholt & Löwgren. They refer to the fact that the design of the artefact is finalized before it is produced. Edeholt & Löwgren (2003) refrain from relating the different dimensions to each other, but final could be considered to be a special case of customisable.

From the comparisons we may also observe that service design can not operate on its own. It depends on specialist competence from interaction as well as industrial design. The areas identified through this comparison, where service design needs specialist competence, are analytic processes, depictive representations, experiential aesthetics, and product deliverables.

Edeholt & Löwgren's analysis (2003) of industrial design and IxD, highlights the difference between them in material. Service design, on the other hand, transcends these materials, being dependent on many different kinds of design objects and materials. Dahlbom's analysis (Dahlbom, 2005, 2003), as well as Edeholt & Löwgren (2003) and Löwgren & Stolterman (2005), suggests that IxD is appropriate when a company views itself as a company that delivers products or artefacts for use. In such cases a service design perspective might be difficult to argue for. When a company views itself as a service company, service design will be easily adopted, while IxD has to accommodate some aspects of the process, the material and the deliverables. IxD and service design share the view of themselves as working from the outside-in, rather than from the inside-out.

Understanding Buchanan's model as a partial model, it is valuable to interpret the design disciplines as integrative disciplines or as boundary openers of the model. Interaction design with the digital material then positions itself as a discipline integrating, to varying degrees, design objects of symbols, things and actions. Service design on the other hand integrates actions and the thought governing the environment in which these actions are performed. That is, IxD and service design together could function as integrating disciplines across the orders of design defined by Buchanan (2001).

CONCLUSION

The comparative framework provided by Edeholt & Löwgren (2003) was adapted to a horizontal comparison between design orders. It was an insufficient framework to describe and explain the similarities and differences between design disciplines within a design order. For that purpose the comparative framework was enhanced with yet a few dimensions. We should expect such amendments to be common to such a framework, especially with design disciplines that are fairly young.

When it comes to design perspectives on these disciplines, earlier challenges have been tied to system development processes, or other material based design disciplines. With service design the challenge lie in its business, innovation and strategy focus, and the holistic approach of setting other design disciplines into a wider social and action context. The possibilities to establish a common ground between IxD and service design could be based on the similarities in material

aspects, such as dynamicity and temporality, and similarities of the design methods employed. Another integrating aspect is that IxD focus on the design of the interactive artefact, while service design focus on the design of the service that the interactive artefact is a part of.

Future research

Analytic frameworks are limited by the underlying values and the content being analyzed. Therefore, there will be a continuous need to develop powerful tools for understanding and characterizing design disciplines

ACKNOWLEDGMENTS

The author wishes to acknowledge the International Service Design Network, and Birgit Mager, Shelley Evenson, and Daniela Sangiorgi, for discussion on the insights in this paper. Mattias Arvola, Per Sökjer and Henrik Artman also have contributed with comments. The author is grateful to VINNOVA, the MAVB and SERV projects for making this possible.

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