

Promoting Service Design as a Core Practice in Interaction Design

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Abstract: With the growth of mobile and social computing, interaction designers are increasingly being asked to design services and systems intended for societal change. In this paper, we argue that current interaction design approaches, inspired by user experience and user-centered design, are insufficient to appropriately take on these new challenges. We propose, instead, that our community considers a service design framing to complement what is already being done in the field. We describe the process of service design, and give examples of service design framings in several projects. We show that a service framing offers a systemic approach that better address the complex stakeholder relationships, yields outcomes in the form of product-service systems, and focuses on how value can be co-produced between customers and stakeholders.

Key words: *Interaction design, service design, user-centered design, user experience design*

1. Introduction

Advances in information and communication technologies (ICTs) along with the growth of social and mobile computing have created many new opportunities for interaction design (IxD). Interestingly, many of these opportunities involve the design of services. The increasing penetration of ICT has also created opportunities for IxD designers to take on societal level problems ranging from homelessness to sustainability to health and wellness. Unfortunately, current IxD practices, grounded in user-centered design (UCD) and user experience design (UX) with a tight focus on the needs and desires of “users”, were not developed to produce a service as an outcome or to drive design teams towards systems thinking needed to address societal concerns.

IxD has a history of evolving its methods, practices, and perspectives in response to new design challenges. In the 1980s, when computers began entering many offices and more and more homes, early IxD designers developed methods to understand the needs and abilities of users. As people became more familiar with computers, and as computing increasingly moved into domestic, social, and leisure contexts, the focus expanded beyond usability, efficiency, and ease of use. New experience design methods emerged, along with a broader concern for the holistic experience of use. As the IxD community evolves the discipline by adapting to newer, more difficult challenges, we see now as the time to take another evolutionary leap: a leap toward the more systemic and stakeholder-centered practice found in service design.

In the past few decades, we have seen an increasing demand for service design thinking in IxD projects. Service design yields solutions that describe the interactions and connections between stakeholders, resources,

technologies, materials, and environments; solutions that provide actionable innovation. For today's IxD designers, a service design perspective provides several benefits. First, a service perspective is explicitly systemic, looking at a problematic situation and its context more holistically in terms of the underlying relationships, roles, and agendas. Second, service design works to create a *meta design* — an intersecting set of people, institutions, and technology systems that collaborate across resources, environments, and processes that together enact a service. Third, a service perspective focuses on the co-production of value. Service designers create opportunities where customers' actions create value for service providers, while creating opportunities for providers to serve customers. Service's focus on value brings in economics as a concern and as a design material. Finally, taking a service perspective allows design teams to explicitly design the behaviors of people in addition to the traditional IxD focus on giving form to the behavior of computer systems.

Our goal in this paper is to inform and excite the IASDR community about benefits of taking a service perspective in the practice of IxD, and to start a dialogue on how service thinking might advance current IxD practices. The evolution to include service thinking has implications for how we teach IxD to future researchers and practitioners, how we practice research through design, and how we frame research results for dissemination. We are not advocating that a service perspective is best for all interaction design projects and challenges. Instead, we suggest that our community can learn and advance by better understanding the framings and methods used in service design, and we suggest that service design has much to learn from IxD.

In this paper, we describe the general process of service design, using selected examples to show how a service perspective can work for the design of mobile and social computing systems and for projects that apply ICTs to tackle societal level problems. We conclude by discussing some of the limitations of a service design framing, and with a call for the IxD research community to continue to investigate the growing overlap between IxD and service. We hope the IxD research community can evolve IxD by incorporating aspects of service design, while retaining the strengths and benefits that have made the UX and UCD perspectives so successful.

2. Service design: a definition and process

Service design emerged in reaction to the transition in many post-industrial countries from manufacturing and selling products to delivering services. Service design grew out of operations research and marketing, two disciplines rarely mentioned in IxD. The service sector continues to grow all over the world: in 2000, the World Bank reported that services represented 66% of the economy for “high-income countries” like the US and most of Europe [20]. Interestingly, one of the strongest drivers of the rising service economy has been advances in ICTs [17] — the very thing that led to and fueled the growth of IxD. The Internet has particularly had an impact, allowing customers to communicate with one another, thus reducing the information control companies formerly maintained [16].

A service can be thought of as a set of choreographed interactions between a customer and service provider [3, 5]. Unlike UCD or UX, which most often focus on the design of a single computational system, service design looks for design opportunities across many different touchpoints that make up a service encounter, regardless of the role computers play. For example, think of the experience of staying in a hotel. There are many touchpoints including selecting the hotel, making a reservation, checking in, taking in the décor of the room, using the toiletries, ordering room service, and even making a connection to the hotel brand. Collectively, individual

interactions across touchpoints and across a number of service agents, computer systems, products, and environments create the service experience. In this way, service design engages a more holistic and systemic perspective on the design situation than UCD and UX.

Service designers work to conceive of a *service concept*: a description of what a service is and how it both meets the needs of customers and fulfills a service provider's strategic initiative [6]. Unlike UCD and UX, which focus almost exclusively on the "user's" needs and desires, service designers work to find solutions at the intersection of the service provider's and the customer's needs. Service design employs a more complex view of the different stakeholders, noting that they often switch roles between customer and service provider. For example, a discharge nurse at a hospital provides information to patients being discharged. She is the service provider and the patient is the customer. However, as she carries out this job, she accesses information prepared by a healthcare team that describes the care plan. In retrieving this information, she takes on the role of customer and the health team providing the information becomes her service provider. It is rare in UCD or UX to think of users as having their own customers who also have needs and desires [8].

In practice, service designers generate and refine diagrammatic models that both represent the current state and represent the potential future state. These models iteratively evolve as a team develops new insights on the present state of the world and make new speculations about the preferred future state. Products, services, people, and relationships must be represented in totality. The goal is to represent elements in a way that rearrangement or alteration reveals changes to the whole ecology.

Researchers in the service design arena have suggested several approaches to modeling complex systems, including molecular modeling [19], conceptual models [10], engineering process charts, PERT charts, and flow diagrams and service blueprints [3]. Three models often used include: a conceptual model, a stakeholder map, and a service blueprint.

2.1 Conceptual model

Service designers create conceptual models to gain a high-level understanding of a system's organization and operations [10]. These models capture aspects of the situation to be designed for by abstracting reality in order to create clarity and focus on the issues within a specific representation. When designers create a conceptual model, they look for structures to describe the problematic situation. The models serve as tools for thinking and sharing stories among a design team. A conceptual model can represent a classification of elements, relationships between elements, a process, an activity, or interactions between people and people, and between people and things. For example, Figure 1 shows two conceptual models of Starbucks. The one on the left shows a sequence model, from a customer's perspective, describing how coffee is ordered. The one on the right shows an element model detailing the most popular drinks. Designers work to choose a structure that best represents the way elements in the model interrelate. Designers delineate the many relationships and mappings between structures. As the design advances, teams often return to a conceptual model of the current state in order to imagine a new model of the preferred future.

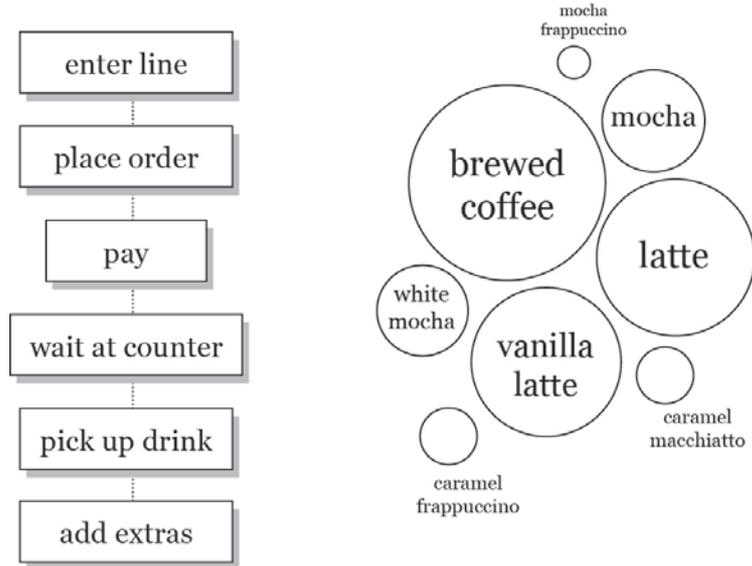


Figure 1. Conceptual models of Starbucks: Left: Process model of getting coffee. Right: Element model of the most popular drinks.

2.2 Stakeholder map (Shareholder Map)

Stakeholder maps [7] can take many forms. Some are simply a list of all stakeholders. Others appear as complex diagrams showing the exchange of information, resources, and value between the set of stakeholders that form a service system. In general, these maps orient around a single customer. For example, a map looking at real estate might have a homebuyer at the center. It would then include the seller, a mortgage broker, both the buyer and seller's banks, lawyers, title search companies, various taxing agencies, home inspectors, property assessors, insurance companies, moving companies, etc. Service design researchers use these models to gain a high-level view of the system, and to identify opportunities for unbundling and re-bundling service offerings [15]. Figure 2 shows a stakeholder map for a proposed TV subtitling service that functions by crowdsourcing the subtitles from fans. The model details how value might be co-produced; with fans gaining a stronger affiliation to the shows they love and the service gaining fast, free, and high quality labor to produce the subtitles.

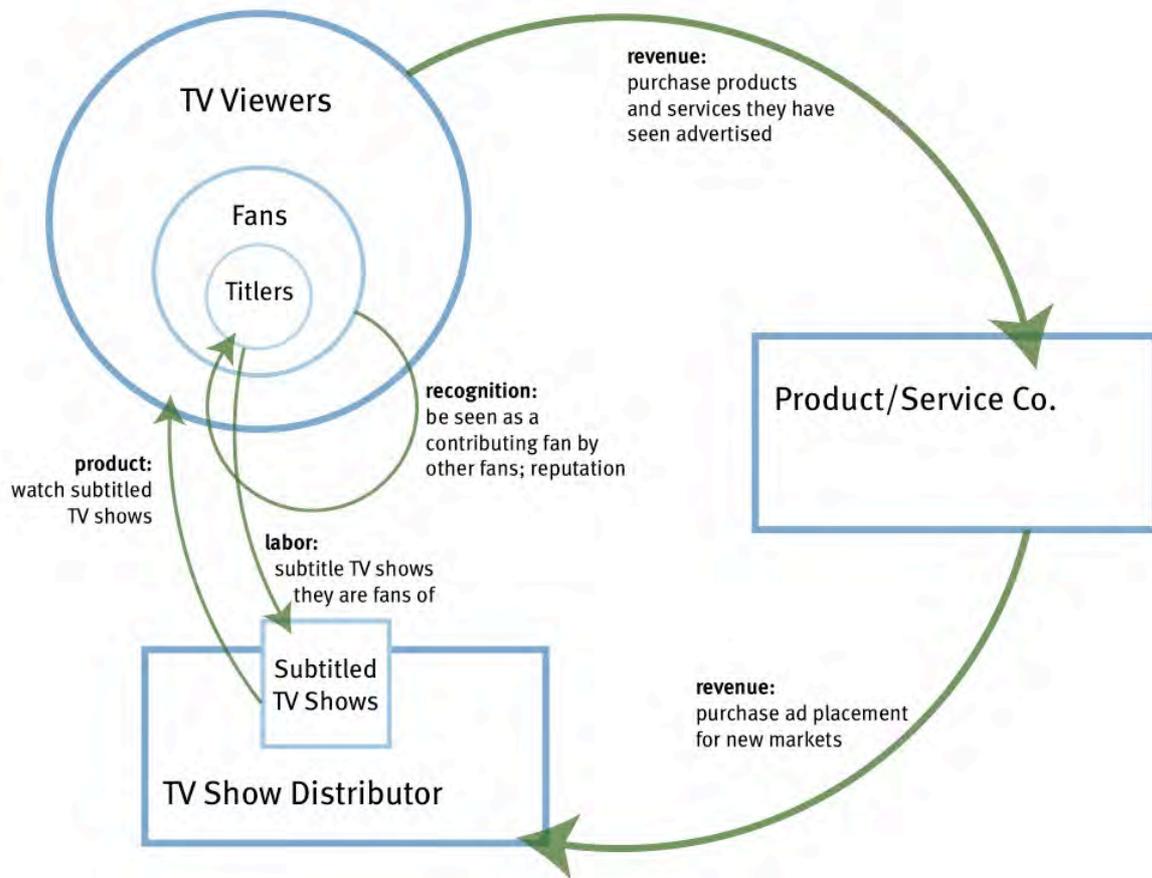


Figure 2. A value flow diagram (a type of stakeholder map) for a speculative subtitling service. Fans provide subtitling labor in order to gain recognition and a stronger feeling of affiliation with the shows they love. The result of subtitling is that the shows are available to a wider audience. Product/service companies gain by having their goods exposed to the wider audience, and the video service gains by generating more advertising revenue.

2.3 Service blueprint

A service blueprint is a diagram of the resources needed to enact the redesigned product-service system. It shows the actions of customers, service providers, and stakeholders in a customer journey's across a service to complete a task. The model details how information is produced and consumed. It details the visible actions and invisible (internal) interactions of all stakeholders. It documents the role of tangible artifacts encountered by customers. Finally, it provides an overview of all of the support processes used using a specific service encounter. To create a blueprint, designers create a taxonomy of items in each category, detail the processes, detail the stakeholders and their visible and tactical actions in using and providing information, and detail the environment and the roles of individual products and services within. Blueprints are used to document a current service as well as to envision future service offerings.

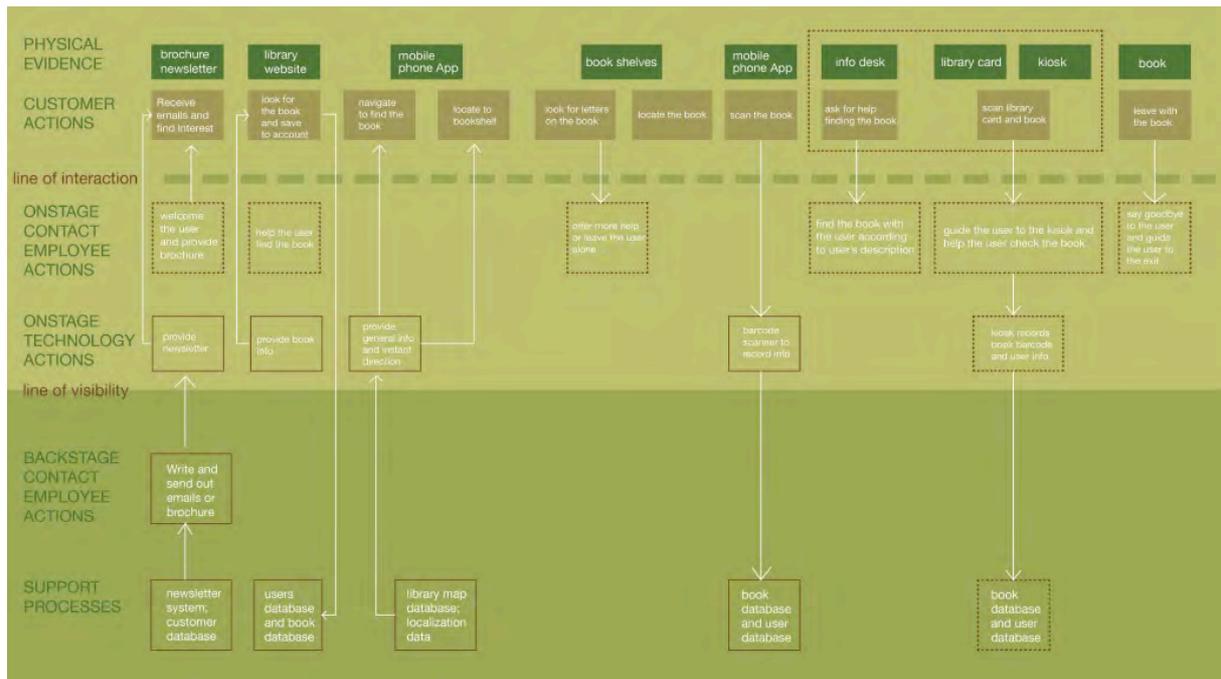


Figure 3. A service blueprint documenting a customer's (library patron) journey when they attempt to check out a book from the library (service provider). Design by Linlin Pan.

These representations become the basis for coordination. They can be used to create and maintain a shared understanding across the design team, to develop scenarios and concepts, and to consider implications of new products, services, and systems that are introduced into the service ecology. They support a solution that is developed iteratively and holistically, evaluated and refined over time, and put forth in the world with confidence.

IxD designers employing UX and UCD practices most often work to specify the behavior of a single computer system. Service designers, however, work to envision a *process* that describes how many different service agents. Customers, stakeholders and computer systems function together as an effective and sustainable ecology.

Interestingly, while the outcomes of the design processes are different, IxD and service designers follow very similar design processes. Service designers start with an explorative phase (fieldwork, competitive analysis, log analysis, etc.), followed by a generative phase (sketching, low-fi prototyping, etc.), and finishing in a refinement/evaluative phase where the details of the design are tested and specified. The general design process is to model the current system as a way of understanding the state of the world and to discover design opportunities, to ideate many possible future states, to rapidly prototype a subset of these, and to assess new concepts with the future users and stakeholders.

3.0 Service Concepts for IxD Designers

Service design offers many concepts not generally used in UCD or UX that can benefit IxD designers. Three we consider particularly valuable include:

3.1 A systemic approach

Service design is explicitly systemic. This is not to say that UCD and UX cannot be done with a systemic framing, but these approaches do not specifically require designers to think in terms of systems. Through the use

of a systemic perspective, service design better supports the challenge of designing for multiple stakeholders. Service designers make diagrammatic models in order to see all stakeholders and how the stakeholders exchange. They continually reframe the situation to understand the preferred state from the perspective of multiple stakeholders. Prototypes explore possible service innovations and assess if unintended consequences might possibly outweigh the advantages of a new design. Service design provides a higher-level, gestalt view of the forces at play in a given situation, increasing the complexity of the design challenge, but also increasing the possible space for solutions.

3.2 A focus on product-service systems

While UCD and UX generally take a product design perspective focused on the creation of a single, computational system, the output of a service design project is a process or a meta-design: a set of interactions across stakeholders, service agents, customers, and many computational systems. Taking a service perspective means moving beyond the idea that every problem can be solved with a single computational system. Instead, it raises the issue of designing many things. This can include physical products, spaces, wayfinding systems, scripts describing the actions and procedures of human service agent, policies, economic models, and much more. More than the other advances that service design brings, this focus on a new type of output challenges IxD to be more than just about the design of digital things. This is a decision that the whole community needs to consider. If as a community we plan to continue to take on societal level challenges, we need to decide if our research and practice efforts stop at the device, or if we are comfortable beginning to view the computation as a critical resource, but also one of many resources that make up a design.

3.3 A focus on the co-production of value

With products, value is exchanged at the point of purchase. The customer exchanges money in order to take ownership of the thing. Services co-produce value at the point of delivery, and ownership is not transferred. For example, a customer pays for a hotel room and gains value during its use. Neither the hotel provider nor the customer can warehouse these hotel rooms as a way to bank them for future value. The value emerges at the point of use, and the customer never expects to own the room at the end of the transaction. The value for both the customer and the service provider arises at the point of interaction.

Service design's explicit focus on value makes the underlying economic model a core aspect of the design. Instead of simply accepting the a current model, service design teams play with the underlying economic model; they treat economics as material they can play with in order to envision a future state. While all IxD researchers and practitioners know that economics are huge drivers in how people select and use products and services, the underlying financial models rarely play an important role in UCD or UX design processes.

4 Examples of IxD design that benefit from a service perspective

In the next section, we provide three examples that detail how the field of IxD might benefit from a service perspective: mobile computing, social computing, and societal challenges. In the cases of mobile and social computing, IxD designers are increasingly being asked to design applications and interfaces that function within a larger service. In cases of applying new ICTs to societal challenges, service design provides a systemic

perspective that allows design teams envision solutions that are larger than a single computer system. Through these examples, we illustrate how a service perspective can aid IxD designers in taking on these new types of design challenges.

4.1 Mobile Computing, Apps, and Services

The meteoric adoption of smart phones and tablets means IxD designers are increasingly being asked to design mobile apps. Often the design of an app requires the design of a larger back-end service that both supports and motivates use of the app. In this case, the app functions as a product in a larger product-service system [Morelli02]. To be successful, IxD teams must envision the underlying service while designing the app.

The Flipboard [www.flipboard.com] app, which integrates content from a variety of sources to create a magazine-like reading experience, provides a good example. Stakeholders include the *content creators* who provide and format their content to work within Flipboard, *advertisers* who provide much of the revenue, *social media services* that support article sharing, the *App store marketplace* where end users can find and download Flipboard, and the *end users* who download and access this app in order to read, comment on, and share different articles with their friends. The system involves a complex and delicate exchange of value amongst the stakeholders, and adding to the complexity, most of the stakeholders switch between customer and service provider roles. Content creators, like the end users, start off as Flipboard customers. Flipboard must seek them out and encourage them to make content available. Content creators become service providers to Flipboard when they make their content available to be captured and transferred to end users. At this point, they also become service providers to the advertisers, convincing them to pay for space alongside the content. End users co-produce value with the social networks, with Flipboard, with the content providers, and with the advertisers when they share links to and comments about different articles with members of their social network. Their social connections and ability to recognize things their friends might like helps drive this co-production.

One driver forcing IxD designers to consider more complex networks of stakeholders comes from the economics of mobile apps. These apps often sell for less than \$1USD or are free. At these low prices, it is often impossible for the app's sales price to cover development and maintenance costs. Therefore, IxD designers must consider how secondary and tertiary stakeholders can also help to generate the revenue needed to pay for the service. IxD designers working in this space must consider the underlying revenue model as well as the needs of many stakeholders while designing.

4.2 Social computing

Since the birth of early group calendars and collaboration tools, social computing has been growing and developing many new forms. Today it is not uncommon for IxD designers to work on new kinds of social media services like Instagram [instagram.com], Pintrest [pinterest.com], and Vine [vine.co], all of which allow people to share and comment on media. IxD designers also work on crowdsourcing services. These range from crowd generated information services like Tiramisu [www.tiramisutransit.com], a mobile service where transit riders co-produce a real-time arrival information service by sharing location traces when commuting, to crowd driven market places like Etsy [etsy.com], where individuals can sell their craft wares, to crowd drive labor markets like Mechanical Turk [https://www.mturk.com/mturk/welcome], which supports the buying and selling of micro-units of labor.

Part of the challenge of designing social computing systems from a UX or UCD perspective is that the systems almost always require users in two distinctly different roles: producers and consumers. These roles generally have drastically different motivations, needs and desires, and many times the same person will enact both roles at different times, depending on their situation at hand. Service design's focus on systems thinking and co-production of value can aid design teams in discovering the intersecting needs of these different user roles. When designing a social system, the goal is no longer to make something so desirable that millions of consumers want to buy it. Instead, design teams must work to conceive of a stable and sustainable social ecology that keeps a balance and harmony between stakeholders as they enact different roles. If the demands of one side grows too quickly, it can easily kill the whole social system.

4.3 Societal Change: the Challenge of Obesity

Nearly 65% of the world's population lives in countries where obesity and associated diseases have become a critical health concern [21]. Recently design researchers and practitioners have begun tackling societal challenges like obesity, bringing the power of design thinking to interdisciplinary teams who leverage new technology to enact change. Personal informatics — systems that monitor, make sense of, and visualize details of people's behavior with the goal of supporting positive behavior change — has become one way IxD designers have attempted to take on these challenges [14].

Current IxD practices focus on the user. Bringing a service perspective makes it easier for design teams to also consider the critical roles of families and friends, medical staff, trained professionals such as dietitians and personal trainers, restaurants and food service providers, and even policy and lawmakers. As an example, consider snacking as a factor in the obesity problem. Snacking continues to increase among people in the US each year, comprising over 25% of people's daily caloric intake [9]. Among the solutions to this are regulating the nutritional intake of snacks, developing new diet plans to help people understand the implications of snacking, or developing technology to help people become more aware of the decisions they make when choosing a snack.

One line of research examines robots that act as social assistants that interact with people over a period of time, performing a service, and changing human behavior in a positive way. A service design framing helps to explore how this technology could help people make healthy snack choices. The Snackbot, along with a snack delivery service, was developed to explore these questions [12, 13]. Stakeholders include customers, others in the workplace, the robot developers, designers, and researchers, the robot's assistants, and the people who obtain and load the snacks on the robots. The context of use and the norms of the workplace also need to be considered. A service perspective helped to develop the robot holistically, rather than advancing autonomous technology. A product-service system was developed to track information about behavior and preferences over time [12, 13]. Subsequently, an understanding of what social effects develop in the community the system is situated in, as stakeholders appropriate it in new ways, creating unforeseen ripple effects [4, 11].

In this way, a long-term relationship between people and technology can be reinforced, and positive behavior change can be supported for a number of stakeholders over the long term. In conceiving of a solution as an interconnected system of products and services, IxD designers are likely to develop solutions that are beneficial for all of the stakeholders in a problematic situation.

5.0 Limitations of a service perspective

Service design has several limitations that are important to understand. First, while service design offers advantages on how to address more complex sets of stakeholders, it still relies on a rather simplistic framing of *customer* and *service provider*. New problems, including societal problems and social computing require the use of much richer roles. Somehow the nuanced and complex relationship between a mother and daughter seems to get lost when they become customer and provider. Service design helps to move past the even more simplistic concept of “user,” but there is a huge opportunity here for research and for the development of new tools that can advance our ability to more effectively address and design for complex stakeholder relationships.

Second, service design methods and practices are optimized towards the innovation of current services, such as the redesign of banking, hotels, and health care. These methods do not work nearly as well to create entirely new services. The design process involves mapping the current service and then searching for opportunities to innovate. This focus on iterative improvement over invention of the new presents an obstacle for our community. IxD has grown up with a strong focus on novelty and the creation of things no one previously imagined. A quick look at social and mobile computing shows a many new inventions that could never emerge from a re-design process. Services such as Twitter, Instagram, Yelp, and Shazam open up entirely new spaces for products and services. They create entirely new things for people to do instead of simply optimizing and verticalizing current activities. This wonderful attitude and desire within IxD to create entirely new things demands new service design processes that support the rapid creation of new services if a service perspective is to thrive in IxD practice, and this presents a rich new space for design research.

Third, on a related note, service design seems timid in its approach to using technology. While technology often drives service innovation, it is often the adoption of well-known and well-understood technology. Current service design practices, with an implied focus on re-designing existing services, clashes with interaction design’s common practice of inventing with new technology. IxD designers think of new tech as a material to play with in order to discover what might be. IxD has a tradition of pushing new technical systems into the world and waiting to see how users appropriate this technology and invent entirely new uses for it. There is a strong emphasis in the IxD research literature to play in this more ambiguous space in order to make more radical and interesting inventions [2, 18]. This love of invention and technology is an opportunity for the IxD community. It is here especially that IxD can bring its culture of innovation and invention and transform the nature of service design.

6.0 Conclusion

IxD design as a discipline continues to advance. In the past three decades, topics of research within IxD have migrated from usability of web sites to social and societal problems and “messes.” In addition, IxD designers are increasingly being asked to design services. In this paper, we argued that current IxD approaches, inspired by UX and UCD, are insufficient to appropriately take on these new challenges. We propose, instead, that our community considers a service design framing to complement what is already being done in IxD. It is our hope that service approaches can complement our already rich discipline, while continuing to advance it even further.

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8.0 References

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