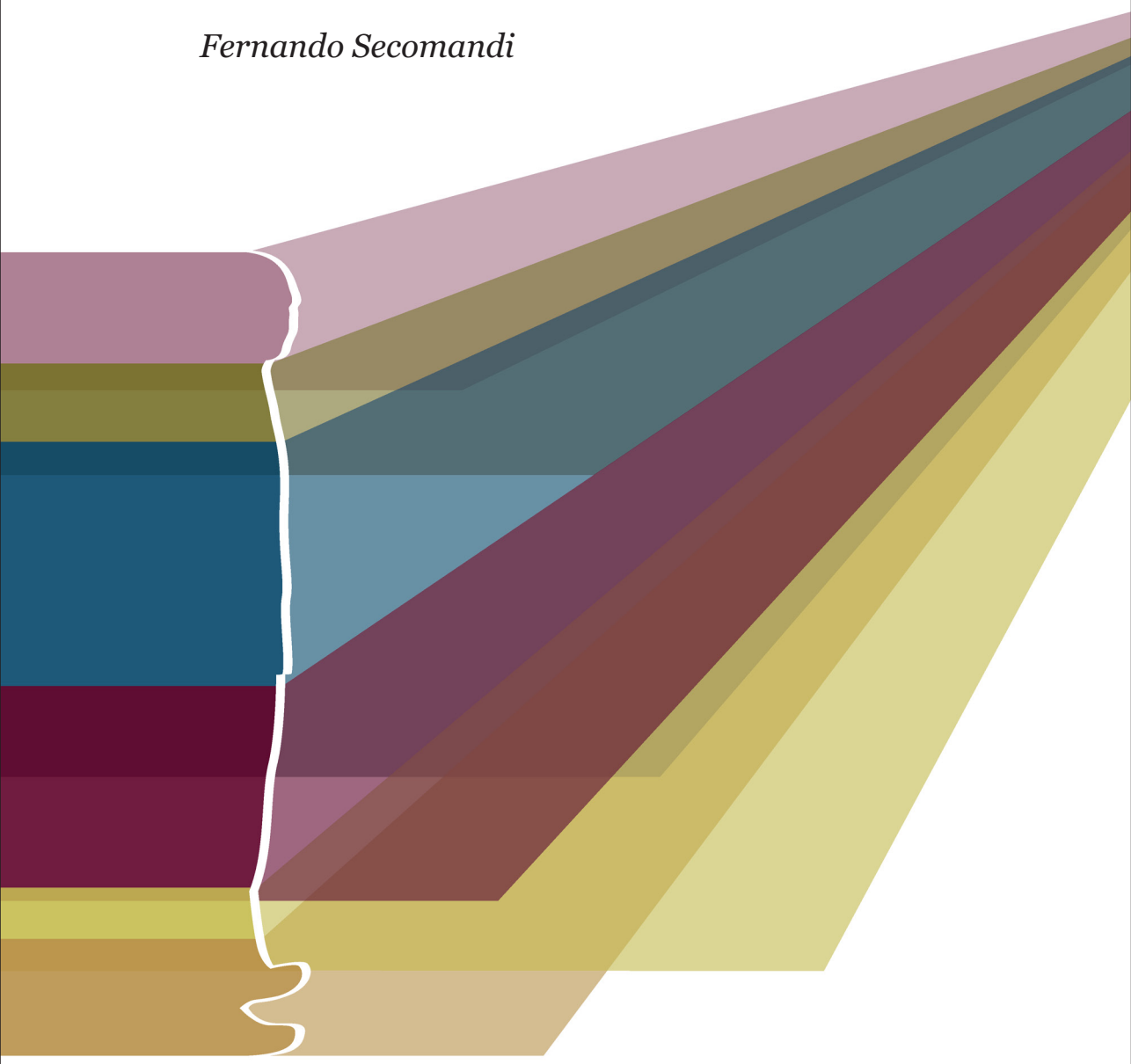
Interface Matters

Postphenomenological Perspectives on Service Design

Fernando Secomandi



Interface Matters
Postphenomenological Perspectives on Service Design

Fernando Secomandi

Digital version
Cover and book design by Alice Bodanzky and Fernando Secomandi

ISBN 978-90-9027226-9

Interface Matters

Postphenomenological Perspectives on Service Design

Proefschrift

ter verkrijging van de graad van doctor
aan de Technische Universiteit Delft,
op gezag van de Rector Magnificus prof. ir. K.C.A.M. Luyben,
voorzitter van het College voor Promoties,
in het openbaar te verdedigen op dinsdag 11 december 2012 om 10.00 uur
door

Fernando Del Caro SECOMANDI

Ingenieur Industrieel Ontwerpen
geboren te Rio de Janeiro, Brazilië.

Dit proefschrift is goedgekeurd door de promotor:
Prof.dr. P.G. Badke-Schaub

Copromotor:
Dr. H.M.J.J. Snelders

Samenstelling promotiecommissie:

Rector Magnificus,	voorzitter
Prof.dr. P.G. Badke-Schaub,	Technische Universiteit Delft, promotor
Dr. H.M.J.J. Snelders,	Technische Universiteit Eindhoven, copromotor
Prof.dr.ir. P.M.A. Desmet,	Technische Universiteit Delft
Prof.dr. H.J. Hultink,	Technische Universiteit Delft
Em.prof.dr. D. Ihde,	Stony Brook University
Prof.dr.ir. P.A. Kroes,	Technische Universiteit Delft
Dr. L. Patrício,	Universidade do Porto
Prof.dr. P.J. Stappers,	Technische Universiteit Delft, reservelid

This thesis was partly financed by the NHTV Internationaal Hoger Onderwijs Breda.

Contents

List of Figures

Preface

Service design has attracted great attention in recent years and given rise to numerous questions for the design community; one of the most fundamental concerns the definition of its object. What do designers *design* when creating new or improved services? The present thesis seeks answers to this question by focusing on the materiality of the service interface. In what follows, the service interface is discussed from different perspectives and portrayed in its various guises. Although the arguments developed throughout the six chapters are interconnected, each chapter is intended as a separate essay that initiates new dialogues with the budding academic discourse on service design, pursuing original contributions of its own.

The appreciation for the materiality of services, probably instigated by my previous training as a designer and the long days (and nights) spent in the workshop, has been deepened in the last years through readings in the philosophy of technology, in an area known as postphenomenology. Progressively, my thinking and writing on the topic of service design became so much influenced by postphenomenology that its inclusion in the subtitle of this thesis is warranted.

Besides this bent of mine, which might make the analyses presented here of interest to some philosophers of technology, the audience of this thesis is primarily thought of as comprising researchers and practitioners in the broad field of industrial design, and secondarily, anyone holding a special motivation to study the emerging discipline of service design.

Acknowledgements

I would like to thank those who provided me with great support in producing this thesis: my supervisors, Petra Badke-Schaub and Dirk Snelders (with extension to Erik Jan Hultink, who co-supervised this PhD project in the first years), for nurturing my development as a researcher and for collaborating with me on several publications; Jennifer Dowdeswell, Tom Rademaker, Joep Rous, and the staff of Philips DirectLife, as well as Miriam de Groot, Babette Doorn, and members of the Service Science Factory, for generously cooperating with my empirical studies; Don Ihde, for warmly welcoming me as an invited researcher at Stony Brook University; Diane Nijs, of the Imagineering Academy, for enabling the financial support of the NHTV Breda; Simon Bolton and Gabriel Patrocínio (Center for Competitive Creative Design), Rodolfo Capeto (Escola Superior de Desenho Industrial), Paul Nini, Bruno Ribeiro and Elizabeth Sanders (Ohio State University), and Mikko Koria (Aalto University School of Economics), for inviting me to lecture or present my work at their institutions; Vera Blazevic, Gui Bonsiepe, Carla Cipolla, Pieter Desmet, Gabriela Goldschmidt, Lucy Kimbell, Nelly Oudshoorn, Oscar Person, Robert Rosenberger, Nynke Tromp, Peter-Paul Verbeek, and the editors and (blind) reviewers of various periodicals and conferences, for commenting on my academic production; Giulia Calabretta, Jaap Daalhuijzen, Joel Kuntonen, and Josien Pieters, for translating, transcribing, or proofreading parts of this thesis; colleagues at the Faculty of Industrial Design Engineering, in especial, the co-ordinators and students of the courses I have taught, for creating a pleasurable yet serious work environment; my parents, for withstanding the longing that no amount of Internet-enabled contact between Holland and Brazil may quench; and Alice, for often impressing me with precious remarks about my research just over dinner—but, above all, for her love and companionship.

Chapter 1
Introduction[1]

Judging from the recent proliferation of dedicated networks, conferences, courses, consultancies, periodicals, books, tools, technical jargon, gurus and smart mobs, industrial design has finally discovered services! And this is nothing less than timely. Although service design has received some scholarly attention at least since the early 1980's, especially in the field of marketing, it remains one of the least explored areas of service research. Throughout the past decades, several researchers have voiced their concern with the limited state of knowledge on service design, calling for more attention to be directed to the area.[2] The general feeling was best encapsulated in Gummesson's (1994, 85) assertion that "there is no general methodology for designing services; there is no profession called service designers."

Eighteen years later, this state of affairs has begun to change, and it is possible to affirm that the design community has made significant strides to make service design a discipline on its own. As reviews of the emerging discipline have already been published elsewhere,[3] it suffices to note here some of its milestones, even if knowing that any attempt to portray a rapidly evolving field is bound to suffer from incompleteness.[4]

---

1. Chapter based on Secomandi and Snelders (2011).

2. E.g., Fisk, Brown, and Bitner (1993, 88); Ganz and Meiren (2002, 21–22); Ostrom et al. (2010, 17–19); Papastathopoulou and Hultink (2012, 713); Patrício, Fisk, and Falcão e Cunha (2008, 320–321); Zeithaml, Parasuraman, and Berry (1990, 157–160).

3. E.g., Blomkvist, Holmlid, and Segelström (2011); Pacenti and Sangiorgi (2010); Saco and Goncalvez (2008); Wetter Edman (2011, 59–70).

4. Publications in leading design periodicals (e.g., Mager and Sung 2011; Morelli 2003; Pinhanez 2009); research groups and programs (e.g., SEDES Research, at the Köln International School of Design, Germany; CRISP Platform, a nationally funded program led by the Delft University of Technology, The Netherlands; DESIS Lab, based at Federal University of Rio de Janeiro—Coppe, Brazil); post-graduate dissertations and theses (e.g., Blomkvist 2011; Moritz 2005; Sangiorgi 2004; Segelström 2010; Wetter Edman 2011); educational programs (e.g., BFA and MFA degrees in Service Design offered by the Savannah College of Art and Design, USA; Master in Service and Experience Design, run by

One of the recurring topics in the forming discipline of service design concerns the definition of its object matter. Over the past years, several researchers have suggested that service designers manipulate the various *interfaces*—sometimes called "touchpoints"— between service providers and clients, including material artifacts, environments, interpersonal encounters, and more.[5] But with a few exceptions that will be examined later in this thesis, the conceptualization of the service interface from a design perspective has been the topic of scant debate. Typically, the origin of the concept is traced back to the notion of *tangible evidence* introduced in Shostack's (1977) seminal writings in marketing. Unfortunately, as argued below, such a portrayal of interfaces places service design on the wrong track, because it turns the contribution of service designers into a peripheral activity—namely, that of "accessorizing" an essentially intangible relation between service providers and their clients.

The lack of clarity over the object of service design is aggravated by the superficial treatment in design scholarship of the alternative concepts and theories found in the service literature. In addition to Shostack, researchers from multiple backgrounds have proposed conceptual handles for thinking about services in the context of their development, commercialization, and use. However, their contributions are sometimes ignored and left scattered across the literature, often obscured by different disciplinary discourses.

The purpose of this introductory chapter is to analyze the various service models proposed in the literature, in order to locate and ground the object of service design in the broader field of academic research on services. In doing so, the intention is not simply to introduce the central theme of this thesis (i.e., the service interface), but also to frame this

---

the Domus Academy, Italy); professional networks (e.g., Service Design Network); service design consultancies (e.g., live|work and Engine, Great Britain); international conferences (e.g., Emergence 2007, USA; International Service Innovation Design Conference 2008, South Korea; Service Design Network Conference 2008, The Netherlands; ServDes 2009, Oslo); books and chapters in edited books (e.g., Hollins and Hollins 1991; Meroni and Sangiorgi 2011; Moggridge 2007; Stickdorn and Schneider 2011); and other Internet-based resources (e.g., Jeff Howard's blog "Design for Service," available from: http://designforservice.wordpress.com, accessed August 17, 2012).

5. E.g., Clatworthy (2011); Mager (2004, 53–56); Moggridge (2007, 422); Moritz (2005, 39–41); Pacenti (2004).

presentation in a critical dialogue with the reviewed literature. As a result, I hope to set a background understanding against which to position the arguments developed in the subsequent chapters of this thesis. At the end of this introductory analysis, the remainder of the thesis will be outlined.

A Literature Review of Service Models

What follows is an introduction to the alternative service models discussed in the literature from distinct disciplinary perspectives. The exposition is based on an extensive survey of academic publications on services and is organized in four subsections, roughly corresponding to the disciplines of service marketing, management, engineering, and economics. The purpose is not to provide an exhaustive overview of all the literature consulted, but to focus on original contributions that can impart knowledge about the topic of interest and are widely applicable across service sectors. As such, there is a certain bias in the selection toward older publications over recent restatements of comparable ideas. Where appropriate, commentaries about related work are added as notes.

The service models of Shostack (1977), Edvardsson and Olsson (1996), Ramaswamy (1996), and Gallouj and Weinstein (1997) will be presented below separately, in an attempt to preserve their internal coherence and conceptual integrity. The descriptions thus remain observant of the authors' intentions and terminologies. However, this approach should not be taken to mean full endorsement of each of these conceptual frameworks. Rather, the goal is to explain these frameworks in sufficient depth, and to invite readers to reflect upon a number of received views on services and design. While doing so, special features of these texts are highlighted, which are pivotal to the argumentation developed in the section that follows, where the content introduced here will be interpreted in order to more explicitly address the question of the object of service design.

Shostack's Evidence

In *Breaking Free from Product Marketing*, Shostack (1977) claimed that marketing's disregard for services could be attributed to an inability to deal with their intangible nature. According to her, services are

impalpable and non-corporeal and therefore "cannot be touched, tried on for size, or displayed on a shelf" (Shostack 1977, 75). The "dynamic, subjective, and ephemeral" nature of intangible elements in services is what prevents them from being described as precisely as products. The introduction of the molecular modeling approach, illustrated in Figure 1.1, was intended to provide a framework for dealing with the marketing of intangibles.

In a molecular model, goods and services are represented as combinations of discrete tangible or intangible elements, with their identity being determined by the relative dominance of each type of element.[6] Shostack argued that most goods and services lie along a continuum from tangible-dominant to intangible-dominant. In Figure 1.1, for instance, automobiles would be deemed products because they are mainly physical objects with tangible options and extras; even so, they also have a service dimension, as they incorporate the intangible element of transportation, which may be marketed independently. On the other hand, airlines can be identified as service providers because of the preponderance of intangible elements.

Although intangible elements are the defining features of services for marketers, Shostack also realized they do not represent their total "reality" for consumers. She argued that because of their abstractness, consumers cannot experience services directly, but can only do so through peripheral tangible clues, or *evidence*. She therefore defined service evidence as comprising everything "the consumer can comprehend with his five senses" (Shostack 1977, 77). In the airlines example in Figure 1.1, this evidence includes the aircraft, advertising, tickets, food and drinks, and other such items. Moreover, staff often stands as the main evidence of services because the way they dress and speak, their hairstyles, demeanor, etc., "can have a material impact on the consumer's perception" (Shostack

6. In the complete molecular model, Shostack later included three outer layers representing strategic marketing decisions about *distribution*, *price and cost*, and *advertising and promotion* (1982, 49–63). Along similar lines, Booms and Bitner sought to expand the traditional 4P marketing framework (product, place, promotion, and price), by incorporating three novel elements (people, process, and physical evidence) into an upgraded 7P marketing mix for services (1981, 47–51). Also consider Lovelock and Wright's addition of an eighth "P" representing service *productivity and quality*) (1999, 18–20).

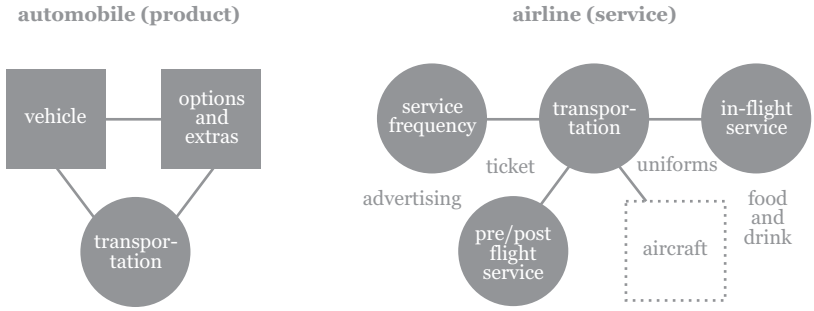


Figure 1.1. *Shostack's molecular model. Circles represent* intangible elements*; squares represent* tangible elements*; dotted squares represent* essential evidence*; and* peripheral evidence *is scattered around the other elements.*

1982, 53). Because service evidence is so important, Shostack believed that it "must be [as] carefully designed and managed as the service itself" (1982, 52).

Shostack distinguished between two types of service evidence: peripheral and essential (1982, 51–52). *Peripheral* evidence refers to the tangible elements consumers can possess but that have little value independently, such as tickets for airline services. In contrast, *essential* evidence, such as an aircraft, has an important role in the evaluation of the services purchased but cannot be owned by consumers. Although essential evidence was paramount in Shostack's conception of services, she considered such evidence to represent "quasi-product elements" that could not have the status of true tangible elements because, as such, they would have been evidence of goods rather than services (1982, 52).

Service evidence came to play an important role in the development of "service blueprinting," a flowchart technique to aid in systematic service design (Shostack 1982; Shostack 1984). In service blueprints, items of tangible evidence usually become departure points for mapping "hidden" production activities that are internal to companies and beyond direct customer contact, or in Shostack's words, below their "line of visibility" (1984, 138). Shostack's work on service blueprinting, which is not detailed here, ran alongside the growing focus of her thoughts on the notion of *process*, which she eventually saw as the service equivalent of a product's "raw materials" (Shostack 1987). Nonetheless, even as her views on the

role of service design centered more and more on blueprinting processes, Shostack still maintained that companies should always "incorporate the orchestration of tangible evidence" (1984, 136).[7]

Edvardsson and Olsson's Prerequisites

Edvardsson and Olsson's (1996) service conception is an amalgam of views commonly circulating in the broad area of service management studies. These authors were concerned that the quality shortcomings faced by many companies were "built into" their services at an earlier design phase. In response, they sought to develop a frame of reference for new service development that would help companies to improve service quality by design.

According to Edvardsson and Olsson, the service construct comprises three elements, as seen in the left side of Figure 1.2. In the first place, there is the *customer outcome*, or what customers perceive and value as the result of service production. Customer outcomes can be tangible or intangible, temporary or lasting. A haircut would be a tangible, temporary outcome for customers, whereas an insurance policy would represent an intangible and lasting outcome. Customer outcomes are formed by customer processes on the one hand and service prerequisites on the other. *Customer processes* refers to the active participation of customers in production processes, which Edvardsson and Olsson saw as a distinctive characteristic of services as opposed to goods.[8] Customer processes do not exist in a vacuum but depend on the *service prerequisites*, which are the resources needed to make the service possible. By engaging in production processes, customers use service

7. Several scholars later adopted the notion of service evidence in their own service models. Worth briefly mentioning are Berry and Parasuraman's (1991, 93–115) identification of *physical environment*, *communications*, and *price* as crucial kinds of evidence, and Bitner's (1993) similar reference to *people*, *process*, and *physical evidence*. More recently, the use of terms like "clues" by Pullman and Gross (2004) and "touchpoints" by Zomerdijk and Voss (2010) conveyed Shostack's notion of evidence from an experience design perspective.

8. Other researchers have also regarded higher levels of customer involvement in production processes to be the most important variable in characterizing service operations and in setting strategic directions for the design of service systems. See, e.g., Chase (1978); Pinhanez (2009); Sampson and Froehle (2006); Wemmerlöv (1990).

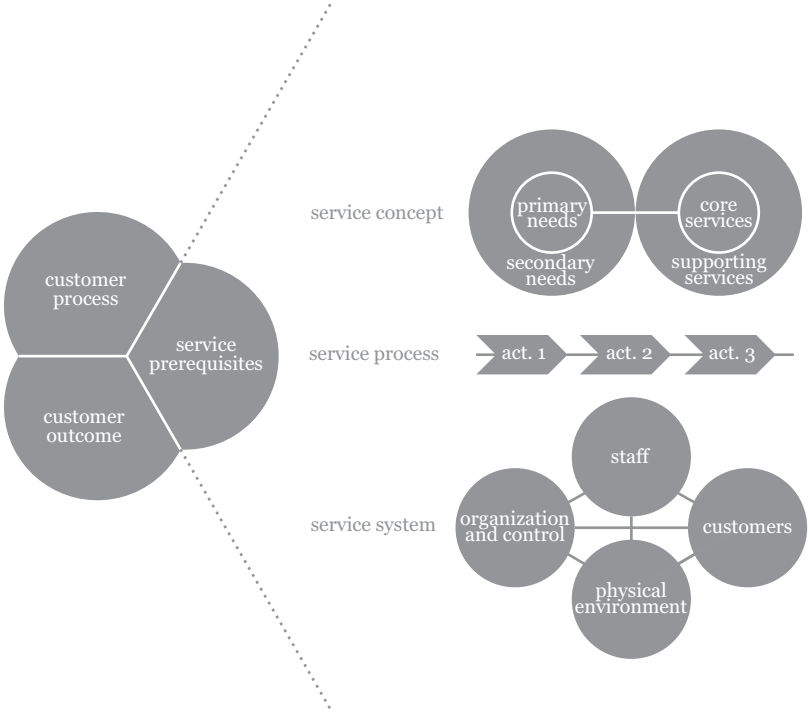


Figure 1.2. *Edvardsson and Olsson's frame of reference. Prerequisites for new service development are detailed.*

prerequisites and coproduce outcomes for themselves. Edvardsson and Olsson thus argued for understanding services from a customer perspective: "It is the customer's total perception of the outcome which 'is the service'... what the customer does not perceive does not exist—is not a customer outcome" (1996, 145).

If outcomes can represent the whole service for customers, Edvardsson and Olsson held that prerequisites were closely associated with the company perspective: "the service company does not provide the service but the prerequisites for various services" (1996, 147). They organized new service development activities around the three prerequisite components: service concept, service process, and service

system (see Figure 1.2, right side).[9] The *service concept*[10] is a brief description of the service package[11] (core and supporting services) that answers different customer needs (primary and secondary). It is the departure point for specifying all other prerequisites. The *service process* represents the chain of activities necessary for service production. Edvardsson and Olsson explained that the service process is a prototype for the activation of *customer* processes upon each unique customer encounter. Finally, the *service system* comprises the following resources that the service process requires to realize the service concept: company staff, customers, physical/technical environment, and organization and control.[12]

It is at the level of service system resources that Edvardsson and Olsson address service development activities in more detail. They considered *company staff* to be a key resource because many services depend on the tangible encounter between the staff and customers. Companies should aim to have motivated, knowledgeable, and committed staff, partly by devising attractive jobs and hiring and training the staff

---

9. Elsewhere, Edvardsson (1995) named the service process and system components the "servuction" process and system. Servuction is a term combining the words "service" and "production" that was invented to denote the simultaneity of production and consumption in services. In line with the original servuction system, customers interact with the "visible" part of a service organization, which consists of the *physical environment*, *contact personnel*, *other customers*, and *customers in person* (Langeard et al. 1981).

10. The service concept is a term commonly encountered in the literature. Clark et al. (1999) presented an elaboration of the service concept in terms of *value*, *form and function*, *experience*, and *outcomes*. For an overview, see Goldstein et al. (2002).

11. The service package, sometimes called "bundle" or "offering," is a multifaceted concept. Lovelock (1992) proposed a basic separation between *core* and *supplementary* services, to which Lovelock and Wirtz (2006, 22–25) later added *delivery processes*. Grönroos (1990, 71–91) departed from this conception of a basic package and described an *augmented service offering*. In a second line of thought, Sasser et al. (1978, 8–14) and Fitzsimmons and Sullivan (1982, 15–29) defined the package as comprising *physical items and facilities*, *sensual benefits* (or explicit services), and *psychological benefits* (or implicit services). Normann (2001, 75–88) further synthesized these latter insights with the previous separation between core and supplementary services. The service package was also considered in other hybrid conceptualizations, such as Lehtinen's (1986, 26–51) *service consumption process* and Grönroos's (1990, 207–214) *service production system*.

12. *Service culture* was later added by Edvardsson et al. (2000, 45–53) as a fifth component of the service system. Another version of the service system briefly contemplated some external influencing factors (Edvardsson 1997).

properly. Second, *customers* themselves could take part as prerequisites of the service system by contributing their own knowledge, equipment, and capacity to assimilate information. According to Edvardsson and Olsson, the service system should be designed to facilitate the engagement of customers in coproducing the outcome. Marketing could also help to establish relations between companies and their customers, for instance, through the design of invoices and information materials. The third resource, the *physical/technical environment*, pointed to the organization of the facilities, equipment, and other technical systems located on the service company's own premises or those of its suppliers and customers. Finally, *organization and control* involved several activities: putting in place administrative systems to support planning, information exchange, finance, and resource allocation. Furthermore, the company's interaction with customers and other partners needed to be controlled by planning such aspects as how to gather feedback and how to handle complaints. In addition, the company should also consider its organizational structure, with proper definition of roles, responsibilities, and authority.

Ramaswamy's Processes

Ramaswamy (1996) turned to the key notion of process, making it the centerpiece of a comprehensive framework for the design and management of services. His framework is so methodical and formalized that it can be seen as a forerunner to several service engineering approaches.[13] From his elaborate work, the stages of conceptualizing and detailing new service processes for implementation are highlighted, because these phases are particularly relevant for designers.

For Ramaswamy, services are fundamentally "nonphysical" entities (1996, 13). A service process is a sequence of activities that provide functions, chronologically organized as a unity. A process may be further divided into smaller sub-processes and sub-subprocesses, and

13. Although notable differences hold true, other researchers also took process, or "activity," as the main building block of their service models, often drawing on knowledge from such areas as mechanical engineering, systems engineering and computer science, and progressing toward more consistent notation, mathematical formalization, and computational modelling. See, e.g., Arai and Shimomura (2004); Ma, Tseng, and Yen (2002); Patrício, Fisk, and Falcão e Cunha (2008); Qiu (2009).

is organized hierarchically, so that a higher level process is completely assembled from its component sub-processes. Service processes comprise two sorts of activities: *service operations activities*, which reflect the steps needed by service providers to transform inputs into outputs, and *customer service activities*, representing the interactions between customers and service providers. An ideal service process begins with input from customers and ends with "visible" output for them (Ramaswamy 1996, 128).

Figure 1.3 (left side) presents a sample breakdown of a restaurant service process, beginning with the arrival of guests and ending when they leave the establishment. Note how the ordering process (second row, left side) consists of customer service activities, represented by customers' receipt of the menu and their meals, as well as service operations activities related to meal preparation in the kitchen.

Ramaswamy claimed that the functions of a new service process should be approached as problems guiding the design of solutions. In his systematic framework, solutions for new processes evolve from broad concepts, associated with larger processes, to detailed components related to progressively smaller sub-processes. Figure 1.3 (right side) illustrates three sub-processes of the ordering process: menu reading and ordering, availability verification, and order validation and correction. According to Ramaswamy, solutions for the sub-processes may be devised by altering key *design dimensions*, or the "characteristics that can be manipulated to influence the performance of the design" (1996, 173). In his example of a computer-assisted ordering process (middle column, right side), these dimensions included the screen display format, menu display interval, verification procedure, and validation method.

Specifying design dimensions in different ways results in various *solution alternatives*, as enumerated below each design dimension mentioned above. However, for Ramaswamy the configuration of a new service process should be finalized only after iterative cycles of evaluation and refinement of solution alternatives. As a result of the final, most detailed design step, one optimal process solution is specified in terms of the *engineering requirements* (last column to the right) needed to create the process, including items such as "the response requirements

whole restaurant service

processes	inputs	outputs
arriving	customer arrives	customer receives menu
ordering	customer receives menu	meal is delivered
	customer service activities *service operation activities*	
	order is delivered to kitchen → order is prepared in kitchen →	order is collected from kitchen
dining	meal is delivered	customer requests bill
billing	customer requests bill	payment is collected
leaving	payment is collected	customer departs

ordering process

subprocesses	design dimensions and alternatives	engineering requirements
menu reading and ordering	screen display format: - 1 item/page with detailed description - all items on 1 page with descriptions on help screen - appetizers, desserts, entrees, and beverages on separate pages with brief descriptions menu display interval: - 2-minute wait before input - 4-minute wait before input	# of menu pages # of menu items per page menu display interval page refreshment interval etc.
availability verification	verification procedure: - for each item upon ordering - for all items after ordering	accessing time inquiry time
order validation and correction	validation method: - waiter sends order to kitchen upon receipt; corrections are sent later, after validation - waiter holds order until complete validation; corrections before sending order to kitchen	transmission rate maximum time for validation

Figure 1.3. *Ramaswamy's restaurant service process.*

of hardware, the look of a menu or screen, the contents of a script to be followed by an employee, or the dimensions and weights of parts" (Ramaswamy 1996, 251). This information, according to Ramaswamy, "is used by the implementation team members who are responsible for constructing the service." In other words, engineering requirements guide "the steps that are needed to transform the design—which, so far, is a set of decisions on paper—into a working service" (Ramaswamy 1996, 258).[14]

Gallouj and Weinstein's Characteristics

This final subsection covers a service model from the field of economics—more precisely, the work of Gallouj and Weinstein (1997). Noting how extant research overly privileged the manufacturing of goods, these authors sought to develop foundations for the analysis of innovation activity in the service sector. Their approach begins with the idea that a service seldom exists autonomously. The authors see in this an important difference from a good, which upon production typically assumes a physical independence from its producers and consumers: "[A service] is intangible and does not have the same exteriority [of a good]... it is identical in substance with those who produce it and with those who consume it" (Gallouj and Weinstein 1997, 540). For them, this condition underlies many of the peculiarities commonly associated with the production of services, such as the necessary cooperation between providers and clients, the difficulty in standardizing something dynamic and multifaceted, and the confusion between *product* ("what" is delivered) and *process* ("how" it is delivered). Gallouj and Weinstein's formal representation of services in terms of *characteristic sets* is shown in Figure 1.4.

Gallouj and Weinstein's characteristics model consists of four interacting sets. Set [Y], on the right, represents the *service* characteristics. These are characteristics of services as seen from the user's point

14. Kaner and Karni (2007) also conceptualized services as hierarchical systems ultimately defined by the values given to their lowest-layer components. Their *capstone model* is a comprehensive, five-tiered service representation consisting of 9 major classes (including process), 75 main classes, 351 minor classes, and potentially thousands of attributes and values.

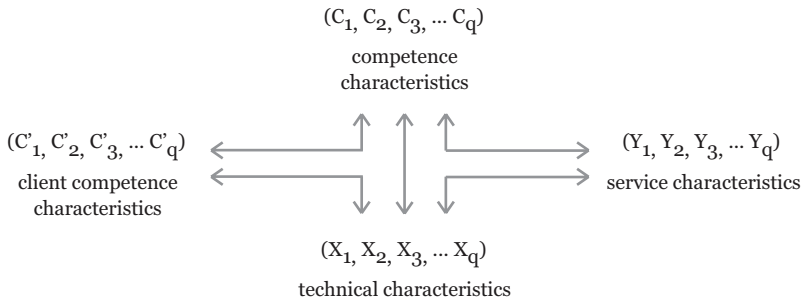


Figure 1.4. *Gallouj and Weinstein's characteristics model.*

of view—in other words, the utilities provided by services to clients. Examples include the user-friendliness and the deposit and withdrawal functionalities of an automated teller machine. Set [X] represents the *technical* characteristics that supply service characteristics, which can be divided into *tangible* technical characteristics (e.g., information technologies, logistic technologies, chemical products in cleaning services, etc.) and *intangible* technical characteristics (e.g., financial models, business execution methods, etc.). According to Gallouj and Weinstein, technical characteristics can also be divided into *product* and *process* characteristics by referring to the interface between providers and clients. Thus, *product* technical characteristics would refer to "front-office" production activities in close proximity to customers, while *process* technical characteristics would be the "back-office" activities that do not entail direct customer contact. Although the authors believed in the validity of this distinction, in the end they assumed that both product (front-office) and process (back-office) technical characteristics could be tangible or intangible, and could all be bundled in the same set [X].[15]

Gallouj and Weinstein further added *competence* characteristics as a way to separate technical characteristics from human capabilities. Set [C], according to the authors, represents provider knowledge and skills embodied in individuals (or clearly delimited teams), which are not easily dissociable from the people themselves and therefore cannot

15. Gallouj (2002, 53) also briefly included in the same set *spatial* and *geographical organization* characteristics (e.g., restaurant décor, proximity of service establishment, etc.)

exist autonomously or become part of organizational knowledge. To highlight coproduction by clients as a major feature of services, Gallouj and Weinstein added *client competence* characteristics (set [C']), representing knowledge that is embodied in clients.

The complete model provides an integrative rationale for service production: Service (Y) characteristics are obtained by the direct application of competence characteristics of providers (C) and/or clients (C'), in combination with mobilized technical (X) characteristics {[C], [C'], [X], [Y]}. The model takes account of a particular class of "pure" services, such as consulting or massage therapy services. In such cases, providers and clients coproduce service characteristics without the involvement of any technical means {[C], [C'], [Y]}.[16] However, Gallouj (2002, 56) later observed that the use of even unsophisticated technologies (e.g., a towel for the massage therapist) could represent an intervention of technical characteristics.

Based on the characteristics model, Gallouj and Weinstein operationalized service innovation as "any change affecting one or more terms of one or more vectors of characteristics (of whatever kind—technical, service, or competence)" (1997, 547). The authors noted that innovative changes might "emerge" as a result of "natural learning mechanisms," but they might also be "programmed," or "intentional, the product of R&D, design, and innovation activity." Unfortunately, they did not explain how intentional innovation could be attained specifically through the manipulation of characteristics sets.[17]

---

16. Based on the model, the authors also describe self-service situations, where service characteristics are created through the client's engagement with technical characteristics alone, without the participation of the provider competence characteristics {[C'], [X], [Y]}. In another publication, Gallouj (2002, 59) further identified "pure" goods situations, where there is no involvement of competences embodied in humans {[X], [Y]}.

17. In recent years, other authors have elaborated on the characteristics approach to service innovation. De Vries (2006) noted how Gallouj and Weinstein's model falls short when representing innovation in a network of organizations, where clients coproduce a service by using their own technologies. He reformulated both the technical and competence characteristics sets to account for multiple organizations, and added the novel *client technical* characteristics set. Windrum and García-Goñi (2008), writing in the context of health care, also pointed to the need for representing innovation in a multi-agent environment, including policy-makers as new stakeholders alongside providers and users. They further diminished the importance of technical characteristics, proposing instead that innovation in knowledge-

The Object of Service Design

Having introduced representative service models in the extant academic literature, in this section I articulate a conceptual framework from which to approach the design object in services. Whereas previously each model was described separately, now I adopt an interpretive stance that engages with that same material at once. The conclusion builds up progressively in the following subsections.

Exchange Relations

One of the most fundamental aspects of service production is the intertwining of stakeholders—most notably, providers and clients—in exchange relations. As Gallouj and Weinstein noted, services are not easily set apart from providers and clients as an independent entity; they seem to exist to a substantial degree within this context of economic exchange. Edvardsson and Olsson, as well as Ramaswamy, also point out the necessary involvement of customers in service coproduction. Even when left implicit, as in the case of Shostack, exchange relations are presumed in the recurrent references to both marketers and consumers.

Exchange relations establish the context for attributing particular roles to the stakeholders involved in service coproduction. Typically, providers devise and market new services; clients purchase and use them. Furthermore, an investigation of the circumstances of exchange relations reveals a host of sociotechnical resources that are required for service coproduction by providers and clients. For Gallouj and Weinstein, service innovation could be linked to changes in terms of human competences, plus tangible and intangible technical characteristics. Other authors who were more prescriptive about service innovation processes developed ideas about the planning and organization of these resources. Following Edvardsson and Olsson's framework, companies developed the right prerequisites, which were then processed by customers, leading to high-quality outcomes for them. Similarly, for Ramaswamy, service providers engineered new production processes, whereas customers provided inputs and evaluated the outputs of such processes. Finally, Shostack advises

---

intensive services is better captured as the negotiation over *competence* and (the newly-added) *preference* characteristics, which are possessed by all agents.

marketers to carefully manage all the tangible evidence that can affect the consumer's experience of a service. Broadly speaking, then, design in services is related to the coordination of a varied set of sociotechnical resources, leading to innovative forms of exchange between providers and clients.

Interface versus Infrastructure

An analytical distinction introduced by many researchers is to separate service production activities into two domains: the "interface," which focuses on the sociotechnical resources immediately associated with exchanges between providers and clients, and the "infrastructure," which accounts for resources less directly related to that exchange. One criterion for distinguishing these domains suggested in the literature is dislocation in time and space. This is apparent in Ramaswamy's restaurant example, where meals are first ordered from and later served by waiters (the interface comprises the customer service activities), while between ordering and serving, the meals are prepared in the kitchen, out of the sight of the customer (the infrastructure comprises the service operation activities). A slightly different criterion was proposed by Shostack, who introduced the concept of the line of visibility. This line separates what is tangibly evident to the bodily senses of consumers (interface) from what is hidden from them in the form of intangible elements or processes (infrastructure). In addition, Gallouj and Weinstein allude to a possible distinction between "what" results for clients from product characteristics in the front-office (interface) and "how" this results from process characteristics in the back-office (infrastructure).

The interface and the infrastructure are inextricable counterparts of the sociotechnical resources involved in service exchange relations, and both can be considered a concern for designers. In Edvardsson and Olsson's account, the company planned the interactions between customers, staff, and physical environments happening at the exact moment of service exchange. But they should also consider other prerequisites, including those that must be in place months before service provision begins (e.g., administrative systems for the allocation of financial resources).

A characteristic of the interface that merits attention, but that has not been sufficiently stressed in the literature, is the way in which the interface *actualizes* the coproduction of a service, as it conveys the infrastructure and brings to fruition an exchange relation between providers and clients. Continuing the previous example, for Edvardsson and Olsson the development of prerequisites extends to infrastructure resources, but the goal is to influence customers' perception of services. And this perception is created at the interface, when customers process the prerequisites into outcomes for themselves. Also, for Ramaswamy the design of new service processes includes the infrastructure, yet results in a working service for providers only after implementation, when inputs and outputs are actually exchanged with customers in service activities at the interface. This preeminence of the interface is to some extent acknowledged by Shostack when she observes that service reality, at least for consumers, can only be known through the tangible evidence. In sum, exchange relations between providers and clients require the mobilization of infrastructure resources but, ultimately, are realized through the interface. For this reason, the service interface always becomes the end-point of design deliberations.

Materiality

In this subsection, I conclude this literature study by highlighting the materiality of the service interface. Despite the emphasis on intangibility encountered throughout the service literature, many researchers have commented on certain tangible aspects of the service interface as well. For example, Shostack deems services inherently abstract and founded on processes. But she observes that they could only be experienced by consumers through what marketers made tangible to them. Ramaswamy, too, who places nonphysical processes as building blocks in his framework, later elaborates on them in terms of concrete engineering elements, such as screen displays and other hardware of his restaurant service concept. Gallouj and Weinstein also include tangible technical characteristics in their characteristics sets. And for Edvardsson and Olsson, the physical/technical environment constitutes an important element of the service prerequisites that are processed by customers.

That the service interface includes material artifacts and systems can hardly be disputed. At the same time, one of the strongest convictions of researchers has been that services are something more than—or, indeed, anything but—a simple physical "thing." Can it be concluded that the service interface, in essence or for the most part, is immaterial?

A closer look at the literature shows several types of sociotechnical resources in services that differ from the material artifacts identified above. For example, in their prerequisite list Edvardsson and Olsson include organization and control resources related to organizational structure, administrative systems, and marketing management. These resources are similar to Gallouj and Weinstein's intangible technical characteristics, which include financial expertise, mathematical instruments, economic models, and so forth. Under scrutiny, such resources seem to be located within the infrastructure domain of the service provider. Therefore, as stated before, these resources need to be actualized through the service interface to affect exchange relations with clients. Hence, Gallouj and Weinstein's proposal that services may be delivered by intangible technical characteristics located at the front office appears to be unsubstantiated. The reason is that, at the moment clients would encounter intangible technical characteristics (e.g., in the form of mathematical instruments in consultancy services), they would experience them through tangible manifestations (e.g., slide projections, or words and graphs in a printed report). The point, of course, is not to downplay the importance of intangible technical characteristics, nor to reduce them entirely to their tangible depictions. Instead, the point is that, for the production of services to occur, intangible resources must be actualized through an interface that is material and available to bodily perception.

A problem area for the idea of a material interface is the consideration of humans as part of sociotechnical resources, especially where providers and clients meet face to face. As Gallouj and Weinstein observe, in the production of some services, providers and clients primarily interact via skills and knowledge that might not be easily dissociated from them. One usual way of thinking about the organization of interpersonal encounters in services is to conceptualize human resources as abstract

and inherent to humans. For Edvardsson and Olsson, for example, company staff members contribute to service production through their knowledge, motivation, and commitment, which providers could develop through proper recruitment and training, among other indirect ways of influencing behavior at the service interface. Another way of dealing with person-to-person interaction has been to pinpoint human resources of a more concrete but extrinsic nature. For example, Shostack observes that manageable service evidence could be found in the way contact employees dress, what they say, and their hairstyles. Comparably, Ramaswamy includes in the engineering requirements of new service processes the scripts that direct the behaviors of people.

Interpersonal service encounters cannot be removed from human subjectivity and spontaneity. However, this reality does not preclude personal interactions in services from being shaped, in the absence of other material means, by the embodied behaviors of providers and clients (e.g., gestures, uttered words). What is implied here is neither a simple "objectification" of human participation in service production, nor an argument for manipulating such participation in the same way one would deal with other material artifacts. Instead, the contention is that service exchange relations between providers and clients are grounded on the materiality of their interfaces, even in the case of interpersonal encounters.

For design, the crux of the matter might lie not in acknowledging the materiality of the service interface, but in understanding its distinctive nature. From this review of the literature, it appears that every time empirical cases are used to exemplify what goods and services are, researchers readily associate goods with a physical thing, yet they fail to apply an equally concrete standard to services. As a result, services are deemed intangible (or elusive, dynamic, multifaceted, etc.), not because they are unavailable to embodied experience, but because what their interface conveys is *predominantly not the standalone artifacts with clear object boundaries that goods are purported to be*. Instead, services are primarily related to embodied human interactions, such as in Gallouj and Weinstein's massage therapy service; diffuse phenomena appealing to the senses, such as the tastes, smells, and sounds in Ramaswamy's restaurant

service; multiple tangible elements organized over time and space, as in Shostack's airlines; and possibly more. The distinctive characteristic that stands out in these cases is not intangibility, but the material *heterogeneity* of the interface of services when compared to goods.

This view sits close to Shostack's concept of tangible evidence. However, Shostack believed the true nature of services to be founded on intangible elements. Although evidence was important for her, it represented only a surrogate "reality" for consumers. Because Shostack reserved the possibility of a genuine material existence for tangible elements, which she associated with goods, she described service evidence with the derogatory term "quasi-products." Service evidence thus came to be inauthentic, peripheral clues of an intangible core. The implication of this view, accentuated later when Shostack adopted processes as the foundation of services, is that the design of evidence could now represent just an ancillary activity, one that creates tangible "accessories" for immaterial services. Going beyond this view, I claim that the service interface *materializes* an exchange relation between providers and clients, and that the design of the service interface, perhaps more than anything else, is the design of the service *itself*.

Shostack wrote three decades ago, and her work continues to inspire researchers who seek to break free from goods-oriented paradigms by approaching the interface as a central object of service design. A danger of unquestionably accepting this influence resides in defining the interface as a tangible material between providers and clients that is peripheral to an intangible service core. In stark contrast, the client-provider interface is crucial to service design because, ultimately, it brings new services into being.

There is a clear tendency in the academic literature to develop more elaborate analyses about the design of the service infrastructures than of the interfaces. The rare discussions on service interface design seem to arise as tangential, after-the-fact implications of planning the infrastructure. This neglect of the interface coincides with the embedding of design discussions primarily in service management and engineering discourses, but also with the timid participation in service research of design disciplines traditionally devoted to phenomena in the interface

domain of services (e.g., product design, interaction design, graphic design, and others).

Outline of this Thesis

The goal of this thesis is to advance original perspectives on the service interface that can furnish support for the design disciplines to take up new grounds in service research and promote a fuller appreciation of design in the service sectors. On the theoretical side, the thesis' main backbone is formed by research in the philosophy of technology, more specifically, in an area known as postphenomenology. Postphenomenology is an approach pioneered by Don Ihde that builds on the philosophical tradition of phenomenology and examines the influence of material technologies on human experiencing of the world.[18] An often-given example in postphenomenological research—although not yet one regarding service situations—is the use of eyeglasses. Eyeglasses allow people see the world through them, and from this "in-between" position they are able transform the world as it is perceived. Similarly, instruments such as telescopes mediate between scientists and the phenomena they observe. Although it has been used predominantly to understand human experience with technologies in daily life and the scientific laboratory (e.g., Ihde 1990; Ihde 1998), in recent years significant efforts have been made to discuss postphenomenology in design contexts as well (e.g., Verbeek 2005; Verbeek 2011).

This is but an elementary introduction; discussions of postphenomenological principles and discoveries will be progressively elaborated in the chapters to come, in connection with relevant service design topics. The remainder of this thesis is structured as follows. Chapter two introduces a theoretical framework stipulating how the service interface may be approached from a postphenomenological perspective. In this chapter, I build on two founding contributions for the approach to service design that I wish to cultivate with this thesis. The first is Elena Pacenti's application of the interface concept as a way to define the object of design in services. The second is Gui Bonsiepe's phenomenological

18. For a recent introduction to postphenomenology, see Ihde (2009).

interpretation of the practice of designing user interfaces. The analysis begins with Pacenti but mostly centers on Bonsiepe's work. I argue that Bonsiepe starts from Heidegger's philosophy of technology in order to explain how technologies mediate human experiences of the world, using that to corroborate an unnecessarily narrow approach to the design of new interfaces. According to his approach, interfaces should always be designed to become perceptually "transparent" for users. I show however that Ihde's standpoint, which may be taken as a critique to the Heideggerian position, offers a more nuanced account of the ways in which people experience interfaces in circumstances of use. By applying a postphenomenological framework to service contexts, I describe four possible modes of client-interface relations, all of which reject the idea of the sheer "transparency" of interfaces: embodiment, hermeneutic, alterity, and background. In the examples provided for each of these modes, I also take consideration of the conclusion presented in this introductory chapter that the service interface can be characterized by its material heterogeneity.

The concluding half of chapter two, then, turns to the implication of a postphenomenological perspective for the emerging practice of service design. Following the lead of both Pacenti and Bonsiepe, I argue that the interface concept points to an area of traditional design expertise and that this expertise can be projected into the new application domain of services. In addition to their proposals, I specify another line of investigation where design needs to reflect upon established practices in view of the particular materiality of services. Thus, chapter two concludes with an allusion to two complementary lines of inquiry for this thesis—one *projective*, the other *reflexive*—, which will be taken up by the empirical studies presented in the subsequent chapters.

Chapters three and four present the first empirical studies carried out for this thesis. These chapters contain in-depth analyses of an innovative service commercialized by Philips, named DirectLife. DirectLife is a typical case of a growing number of services now relying on client-provider interfaces that are predominantly based on digital technologies. Therefore, the investigation developed in these chapters can be called projective, insofar as designers of a service like DirectLife

may already draw on earlier acquired expertise coming from the fields of interaction design, among others.

Specifically in chapter three, the argument is set as a reaction to what I see as a growing tendency in service design research to move away from an approach that focuses on the material interface. I address in greater detail the argument of Daniela Sangiorgi, which holds that the interface provides a limited perspective on service design because it fails to integrate the sociocultural dimension embedding service experience. Based on the postphenomenological approach introduced in chapter two, however, I demonstrate the opposite: that the sociocultural dimension of services can only be experienced by people in interaction with a material interface. To substantiate this claim, I draw on a descriptive analysis of the DirectLife service. This analysis is based on my own experiences as a client, added to a two-month long usability study with six other participants. This study of DirectLife also presents an opportunity to delve deeper into postphenomenological notions that were only briefly introduced in chapter two. In particular, I provide insight into (a) how the service infrastructure is experienced through the material interface; (b) how the service interface does not merely "connect" clients with providers, but co-constitutes these entities as such; (c) how the service interface transforms clients' perception of their bodily and social identities; and (d) how the adoption and use of a new service involve complex negotiations between clients and interfaces. The conclusion is that, instead of focusing away from it, design must better acknowledge how service interfaces transform the social reality of clients in ways that are worthy of careful manipulation.

Chapter four continues the analysis of the DirectLife service, but instead of addressing the client perspective, turns to the experience of designing one of its interfaces. This chapter starts with an overview of empirical studies into the practices of service designers who work in the role of consultants. I observe that these studies generally highlight the important role materiality plays in the design process. Next to that, I argue that some of the materials that are generated and used in the process are especially relevant for designers because they serve as intermediary visualizations of the service interface that is the final object

of their activities. With the intention of clarifying how these visualizations are interpreted from a design perspective, I present an extended review of a line of postphenomenological studies, forefronted by Ihde and others, that examines scientific technologies of imaging and the role of materiality in the design process. I argue that postphenomenology presents useful concepts for understanding how the service interface is experienced by designers through various types of visual materials. Empirical support for this claim comes from a study of DirectLife based on in-depth interviews with several professionals involved in the design of a new website interface. By describing the major phases of the design process, running from early conceptualization to later implementation, I advance several propositions, including (a) that design visualizations afford multiple coherent interpretations of the service interface; (b) that the experience of these visual materials is constituted socially, in relation to the clients for whom the service interface is intended, as well as to other professionals participating in the design process; and (c) that the manipulation of materials portraying the service interface influences in significant ways how these professionals conceive of the design project.

Chapter five presents the last empirical study done for this thesis. The case under analysis deals with the design of a new service concept intended to strengthen the relations between the Department of General Practice of the Maastricht University and professionals involved in primary care in the southern part of The Netherlands. This project was organized by the Service Science Factory of that same University and counted on me integrating the design team. The primary objective of this chapter is to extend the approach developed in this thesis to situations where the service interface is primarily *not* based on digital technologies, but on more immediate forms of human-to-human contact. My analysis is geared toward explaining that interpersonal service relations also comprehend a material interface. By addressing an interface matter (i.e., interpersonal contact) that sits beyond the domain of expertise of traditional design disciplines, and by reflecting on my own involvement as a designer, this chapter engages more fully with the reflexive line of inquiry proposed by this thesis, where design is invited to reconsider extant practices in view of the particularities of services.

Chapter five also implicates a change in tactic. To this point, the principal thesis arguments have been made by problematizing relevant topics in the service design literature and using postphenomenology to shed new insights on those issues. Now, the core of the argumentation turns to a critical examination of postphenomenological theory. This variation comes with the recognition that postphenomenology, although it illuminates the practice of service design in cases where interfaces are embodied in digital technologies, it is more ambivalent about the possibility of characterizing interpersonal services from that same interface perspective. After performing a detailed interpretation of Ihde's notion of *technique,* I propose that aspects of the human body may be approached as a particular type of material artifact, but that acknowledging this requires questioning the privileged position given to nonhuman forms of materiality that is deeply entrenched in postphenomenology's methodology. The chapter closes with a discussion of alternative proposals found in the service design literature on how to deal with human-based services and some speculations about what a postphenomenological perspective to the human interface may bring to service design.

Finally, chapter six presents a discussion that seeks to consolidate the main contribution of this thesis in a way that complements the analysis found in this introductory chapter. While here I worked from the "outside-in," situating for industrial design the theme of service interfaces in relation to a broad overview of service research, toward the end of the thesis, this theme has matured to the point of proposing, from the "inside-out," what a postphenomenological perspective can add to our present understanding about services and design.

Chapter 2
Interface Design in Services: A Postphenomenological Approach[19]

Based on a critical study of the service literature, the previous chapter has established the primary area of concentration of this thesis in the service interface. The purpose of the present chapter is to elaborate on the service interface from a design perspective, thus providing the theoretical basis for the empirical investigations of subsequent chapters.

Two preceding contributions will be used as a starting point to develop this approach to the design of service interfaces. The first is Elena Pacenti's (2004) work, which is commonly acknowledged as pioneering in the field of service design, but rarely discussed in depth.[20] Pacenti advanced an original perspective to service design drawing on the discipline of interaction design and on service theories in the areas of economics and management. She justifies the appropriation of interface design theories for thinking through services on grounds that the advent of computer technologies in the last decades has led to significant changes in the service sectors, especially regarding the direct involvement of users in the delivery process.

The influence of computer technologies on design theory is visible again in the work of Gui Bonsiepe (1999), which forms the second stepping stone for my approach to the service interface. Bonsiepe interprets design as a practice devoted to the creation of user interfaces, by which he means the link between people, technologies, and actions. Bonsiepe is in the company of others in the field of human–computer interaction who drew substantially from Heidegger's phenomenological philosophy when taking the situated actions and embodied experiences of users as

---

19. Chapter based on Secomandi and Snelders (2013).

20. E.g., Blomkvist, Holmlid, and Segelström (2011, 309); Maffei, Mager, and Sangiorgi (2005, 1,5); Maffei et al. (2005, 59); Meroni and Sangiorgi (2011, 16–17); Pacenti and Sangiorgi (2010, 27–28); Sangiorgi (2009, 416).

foundational for the design of new interactive technologies.[21] Bonsiepe is perhaps unique among these researchers in extrapolating his ideas to areas beyond that of digital technologies, using the interface concept to discuss the object and nature of design expertise in professional practice.

Thus, if on the one hand Pacenti provides a pathway for exploring interface design as it relates to services specifically, on the other hand, Bonsiepe invites us to rethink design expertise while adopting a phenomenological perspective on the service interface. In this chapter, I revise Bonsiepe's approach by drawing on a criticism to Heidegger advanced in the context of postphenomenological research. This revision proposes a nuanced way of thinking about the design of service interfaces and the special expertise that is required.

Pacenti's Approach to the Service Interface

To the best of my knowledge, the first within the design community to draw attention to the interface on basis of a systematic study of the academic discourse on services was Pacenti, in her doctoral studies at the Politecnico di Milano.[22] Similarly to the findings presented in the first chapter of the present thesis, Pacenti concludes that a defining characteristic of services lies in the fact that they are produced in exchanges between providers and clients. She is particularly inspired by the concept of "service evidence," coined by Shostack to denote all tangible cues used by clients to evaluate a process that is organized and rendered for them by a provider. Pacenti's original take on Shostack's insight is to draw an analogy between the notion of "service evidence" and that of "user interface" coming from the field of interaction design. She writes:

> The service can in fact be observed as a complex organizational system or just starting from its interface. From the user's point of view, the image and the identity of the service (what it offers and how it works) are realized in its interface, in what he or she experiments, sees and feels, and of little importance for the aims

21. E.g., Dourish (2001); Ehn (1988); Fällman (2003); Winograd and Flores (1986).

22. The following analysis is based on two published summaries of her doctoral thesis (Pacenti 2004; Pacenti and Sangiorgi 2010).

> of the interaction is the organizational structure that is behind (Pacenti 2004, 158, my translation from Italian).

Pacenti argues that there are special conceptual gains from adopting an interaction design perspective to the service interface. One is to acknowledge the *temporal* dimension of the interface, while the other is to appreciate its nature as an event *in potential*. In both aspects, she builds on the earlier approaches to interface design set forth by Anceschi (1992) and Montefusco (1992).

Anceschi had noted that while designers traditionally occupied themselves with two- and three-dimensional forms, computer technologies demanded from them the integration of a temporal dimension, where form unfolds in open-ended dialogue with the behaviors and gestures of a user. For Anceschi, the interface was therefore the "place of the interaction" (1992, 40), a definition that Pacenti cites and readily converts to services:

> The service interface, in analogy to the interface of a complex and interactive artifact, is in fact "the domain, the zone, the scene where the interaction takes place" (Pacenti 2004, 159, my translation from Italian).

Montefusco started with the idea that interactive artifacts involve the actions of users, but placed greater emphasis on the part of the human actor. According to him, without a human performance that can actualize the interaction, the interface is plainly an "inert" material. Montefusco, thus, endorsed the view that designers should "transcend" the physical materiality of the interface, in order to concentrate on the user behaviors associated with it (1992, 131). Pacenti imports the idea of a "potential event" into her characterization of the service interface in the following manner:

> What is common between the behavior of services and that of interactive artifacts....is, moreover, their nature as "potential events." Prior to the moment of fruition by a user, the service, like the performance of a computer or a communicative artifact, exists only in its potential form. It is only thanks to the user's

> action that the service performance actualizes itself (Pacenti 2004, 160, my translation from Italian).

While Pacenti is inspired by these approaches in the field of interaction design, her conception of the service interface is not limited to the user interaction with a machine only. Instead, she sees the service interface as comprising a "mix" of diverse elements, including aspects of the physical environment, technical instruments, and human providers (Pacenti 2004, 161).

In the next chapter of this thesis, I will return to Pacenti for a criticism of her conception of the service interface. I should note, however, that Pacenti partly anticipates the ambition of this thesis in combining theories from service research and interaction design in order to develop an original approach to the design of service interfaces. As she proposes:

> The interface concept, applied to services, allows to approximate the behavior of services to the behavior of interactive artifacts, and to utilize the tools developed in the discipline that deals with the design of the latter for specifying a new set of conceptual and operational tools for the design of services (Pacenti 2004, 159, my translation from Italian).

Bonsiepe's Approach to Interface Design

Bonsiepe is usually remembered in design circles for his life-long dedication to the topic of design for development.[23] However, in the late 1980s, his interests also branched into the topic of human-computer interaction (Bonsiepe 1999, 9). While working as a designer for a software development company in the United States, Bonsiepe rediscovered the work of Heidegger under the influence of Dreyfus (see Fathers 2003, 51).[24] His Heideggerian approach to interface design was subsequently

23. E.g., Fathers (2003); Margolin (2007).

24. It is worth noting that Dreyfus was a strong disseminator of phenomenology and the philosophy of technology to computer science audiences. His interpretation of Heidegger has influenced Winograd and Flores, who, according to Leon (2005, 88), were the founders of the company Action Technologies, where Bonsiepe was employed as chief designer. Winograd and Flores also co-authored a seminal critique of the design of computer technologies under the sign of Heidegger (Winograd and Flores 1986). As made

forged in a series of articles collected in the book *Interface: An Approach to Design*.[25]

Bonsiepe's conception of the interface in the book cited reveals a marked influence from Heidegger's early philosophy of technology. In a famous passage, Heidegger had described someone picking up a hammer to perform an ordinary activity—to drive a nail into the wall. In ordinary use, Heidegger observes, the hammer does not draw attention to itself, but rather to what is reached through it (in this case, primarily the nail in the wall). It functions as a *tool*; it is useful; it is "in-order-to" assign the person to another aspect of the world. The hammer "withdraws" in action and acquires a kind of perceptual transparency for its user. It is, in Heidegger's terminology, "ready-to-hand." However, if the hammer breaks down or goes missing, the user's involvement in the activity gets disturbed. When this disturbance happens, the tool, along with its referential network (i.e., the project, the material it is made of, the nails) becomes conspicuous. Now the hammer draws attention to itself, not as a useful object, but as an obstruction for the user. It becomes "present-at-hand."[26]

Bonsiepe appropriates the phenomenological insights above into his tripartite "ontological design diagram," which he describes as follows:

> Firstly we have a user or social agent who wants to realize an action effectively; Secondly we have a task which the user wishes to perform, e.g. cutting bread, putting on lipstick, listening to rock music, drinking a beer or performing a root canal operation;

---

clear by Bonsiepe (1999, 138–140), he admired Winograd and Flores's book greatly, and this appreciation might have led to the influence of their views on his own approach to interface design. However, Bonsiepe's take on Heidegger does not exhaust his reflections on the relation between the interface concept and design. The word "interface" appears in Bonsiepe's texts as early as in a 1973 publication, where he states: "Certainly, it is not to the development of all industrial products that the industrial designer contributes his design capacities, but to those 'interface' product types with which the user engages in direct interaction, by manipulating or perceiving them" (my translation from Spanish). For this citation, as well as an analysis of the maturation of Bonsiepe's thoughts on this issue prior to his publications inpired by Heidegger, see Carlsson (2004, 39–43).

25. Other editions of this book were published in Italian (1995), German (1996), Portuguese (1997), and Korean (2003).

26. This passage is based on the interpretations of Heidegger by two leading postphenomenological philosophers of technology (Ihde 1979, 103–129; Verbeek 2005, 77–80).

> Thirdly we have a tool or artefact which the active agent needs in order to perform this task effectively—a bread knife, a lipstick, a walkman, a beer glass, a high-precision drill rotating at 20,000 rpm. It must now be asked how these three heterogeneous areas—a body; a purposeful action; and artefact, or information in an act of communication—are connected. They are linked by the interface (Bonsiepe 1999, 28–29).

This conception of the interface is much inspired by Heidegger's analysis of the tool, as evidenced by the following observations. First, the interface reveals how users are connected to other aspects in the world. Bonsiepe illustrates this point through reference to the interaction between a computer user and the digital information stored on that computer:

> The digital data stored (on a hard disk or a CD-ROM) are coded in the form of 0 and 1 sequences and have to be translated into the visual domain and communicated to the user. This includes the way commands like "search" and "find" are fed in, as well as the design of the menu, positioning on the screen, highlighting with colour, choice of font. All these components constitute the interface, without which the data and actions would be inaccessible (Bonsiepe 1999, 30).

Second, the interface defines a tool only in relation to a context of action. Consider Bonsiepe's analysis of the scissors:

> An object only meets the criteria for being called scissors if it has two cutting edges. They are called the effective parts of the tool. But before the two cutting edges can become the artefact "scissors" they need a handle in order to link the two active parts to the human body. Only when the handle is attached is the object a pair of scissors. The interface creates the tool (Bonsiepe 1999, 30).

Third, Bonsiepe understands the interface as establishing a context within which objects and data are encountered as available for use; that is, they are "ready-to-hand":

> The interface reveals the character of objects as tools and the

> information contained in data. It makes objects into products, it makes data into comprehensible information and—to use Heidegger's terminology—it makes ready-to-hand….as opposed to present-at-hand…(Bonsiepe 1999, 29)

For Bonsiepe, the interface does not rest exactly in the tool itself, but in interactions among users, actions, and tools. The main design task is to organize these relations and thus to enable the realization of actions:

> It should be emphasized that the interface is not a material object, it is the dimension for interaction between the body, tool and purposeful action….The interface is the central domain on which the designer focuses attention. The design of the interface determines the scope for action by the user of products (Bonsiepe 1999, 29).

While Bonsiepe at first defines the interface broadly, as the "dimension of interaction," his concrete examples also hint that the tool can be a more specific basis of demarcation. In a recent publication, Bonsiepe reinforces this ambiguity, arguing that in less complex artifacts, such as a drinking glass, the interface coincides with the whole artifact itself. However, as the complexity of artifacts grows, the interface becomes a domain of its own. Therefore, where the design of a complex artifact, such as a computer, is concerned, the interface possesses a dual meaning:

> "Interface," in the restricted sense, means the design of controlling and informative elements. "Interface," in the broadest sense, means the design of an entire product to which an interface is attached (Bonsiepe 2011, 175, my translation from Portuguese).

I will not further discuss the meanings of the term for Bonsiepe here, but simply conclude that the materiality of the interface, as an artifact experienced by an embodied human being, features prominently in his approach to design:

> It may be maintained that all design ultimately ends in the body….the task of design is to attach the artefacts to the human body (Bonsiepe 1999, 35).

My contention is that designed interfaces should not always be "transparent" to the embodied experience of users, as Bonsiepe believes. But before elaborating this critique of his approach, both in relation to service design and design in general, it is necessary to introduce a post-phenomenological perspective to the interface, with an application to the experience of using services.

A Postphenomenological Perspective on the Service Interface

Heidegger is considered to be a key philosopher of technology, and the insights of his "tool analysis" were seminal in the development of the postphenomenological philosophy of technology pioneered by Ihde.[27] In Ihde's (1979, 103–129) interpretation, Heidegger showed that a technology is never a mere instrumental object "in-itself" but always conveys for humans special ways of acting within an environment and of disclosing knowledge about the world. Ihde observed that in Heidegger's tool analysis, however, the technological artifact (e.g., the hammer) is left largely implicit and is only evidenced in a negative fashion, in situations where it breaks or goes missing (i.e., where it becomes present-at-hand). In response, Ihde develops a more nuanced consideration of the ways in which technology mediates human experience of the world, one where the conspicuousness of the artifact is not necessarily the result of a "breakdown." His most extensive treatment of this topic proposes four modes of human–technology relations: embodiment relations, hermeneutic relations, alterity relations, and background relations (Ihde 1990, 72–123).

Ihde's followers have held varying interpretations concerning the nature and number of human–technology relations. In Verbeek's (2005, 123–128) understanding, only embodiment and hermeneutic relations are relations of technological *mediation,* or relations where the world is experienced "through" artifacts.[28] Selinger (2006), on the other hand, dismisses background relations from the set when human intentionality

27. For a more complete perspective on his praise of and rebuttal to Heidegger's philosophy of technology, see Ihde (2010a).

28. Verbeek (2008, 389) later revised his position and acknowledged that background relations involve technological mediation, too.

is influenced by technologies. One rare exception where the four modes of human–technology relations are regarded with equal importance is Riis's (2011) analysis of architectural archetypes.

However, Ihde himself highlighted the non-neutral effect of all types of relations in human experience of the world, further stating that "within all types of relations, technology remains artifactual, but it is also its very artifactual formation which allows the transformations affecting the earth and ourselves" (1990, 108). This "artifactual" quality of the service interface is precisely the focus of the descriptions which follow next. Starting with the fourfold classification provided by Ihde, different types of client-interface relations in services can be elaborated as follows.

In *embodiment relations*, clients "incorporate" the service interface into their embodied capacity to experience the world. According to Ihde (1990, 80), embodiment relations sit close to Heidegger's notion of the ready-to-hand and his example of the hammering practice. Merleau-Ponty also described similar experiences, for instance, when explaining how a blind man extended his perception with a technological artifact, sensing the world through the tip of his cane (see Ihde 1990, 40). A variation of this example in a service situation would be of a visually impaired person who rents a guide dog and enters an embodiment relation by incorporating the animal as a way of perceiving (and circumventing) obstacles in her path. A considerable period of training of both dog and user is necessary for such experiences to occur. However, once the training is received, the perceptual focus of the person holding the dog by the leash is not as much on what is held, as it is on the world that is experienced through it.

In *hermeneutic relations*, clients rely on their interpretive capacities to "read" some aspect of the world through the service interface. One example of a hermeneutic relation described by Ihde (2002, 82) is e-mail communication. In contrast to embodiment relations, where technologies are almost completely assimilated into the sensory human body, in a hermeneutic relation the technology itself "becomes the *object of perception* while simultaneously referring beyond itself to what is not immediately seen" (Ihde 1990, 82). Bringing Ihde's example to a service

context, a client can enter a hermeneutic relation with a virtual helpdesk when contacting a service provider via e-mail. By writing complaints and reading replies, the person has the experience of talking to another human being. This person "on the other side" of the interface is not immediately seen by the client but is instead presented through the text appearing on the computer screen.

In *alterity relations*, clients engage the service interface by directly interacting with it. This kind of relation is most clearly opposed to Heidegger's readiness-to-hand. In alterity relations, technologies can be objectively present for a user in a positive sense, without requiring a situation of breakdown in use (Ihde 1990, 98). The term "alterity" alludes to situations where the technology becomes a quasi-other in relation to people (Ihde 1990, 98). Examples include cases where a technological artifact gains a sort of anthropomorphic quality during use, thus becoming "animated," as happens when playing with a spinning top (Ihde 1990, 100) or a toy robot (Ihde 2009a, 43).

Alterity relations are likely to be common in the exchange of services when clients have interpersonal contact with providers. One such situation is the transmission of bodily skills via demonstration. For instance, ski instructors rely on a range of methods for teaching people how to ski. Part of the teaching procedure typically involves asking students to follow the instructor down slopes of increasing difficulty, while trying to replicate the instructor's movements. In the process of trying to mimic, the student moves the instructor's bodily demonstration to the forefront of experience, almost to the point that it eclipses other aspects of the environment, such as the steepness of the slope, the required skills, and the instructor's oral advice. Here, the alterity relation the students establish with the instructor implies quasi-otherness, in that the relation is not directly with the non-reducible human "other," but more precisely through the artifact created by the instructor's objectified behavior. But however totalizing this experience of the instructor may be for many beginning skiers, other aspects are reached and transformed through this human-to-human interface—new skills are acquired and the challenging slopes become less threatening.

Finally, in *background relations*, clients experience the service

interface as contextual for their actions in the world. One of Ihde's (1990, 110) examples for this type of human–technology relation involves experiences with sheltering technologies, like homes. Ihde observes that background relations also involve a withdrawal of technology, which is similar to Heidegger's readiness-to-hand, but of a different sort. He explains: "The technology is, as it were, 'to the side.' Yet as a present absence, it nevertheless becomes part of the experienced field of the inhabitant, a piece of the immediate environment" (Ihde 1990, 110). In service situations, a background relation occurs when, for example, two friends go for a drink at a local bar. The friends can be so absorbed in talking to each other that they barely notice the atmosphere created by music, furnishings, lighting, and the murmurs of the other clientele. The tendency is to attend to each other directly, while the service interface with the bar is less distinct in the experience of the guests. Although in this case the service interface sits in the background of perception, it still is able to influence the conversation from this field position, for instance, by subtly altering the clients' moods and sentiments toward each other.

By describing client experiences with interfaces that include humans, animals, physical devices and environments, I follow the claim made in the previous chapter, which may also be underscored by Pacenti's views, that services are characterized by the *heterogeneity* of their material interface. Nevertheless, it must be acknowledged that the interface "materials" described above differ significantly from the sort of technologies Ihde himself analyzes. As Pacenti already observed, many significant client-interface relations require the presence of human providers for processing the exchange of services. These are largely ignored in Ihde's analyses. Still, the position here is that the major structural features that Ihde identifies can be discerned in the way clients experience service interfaces, even when such relations are to a large degree based on interpersonal contacts with providers.

Before concluding, from a postphenomenological standpoint embodiment relations are not the ideal type of relation, around which all others gravitate. Nor is each of the client-interface relations described above rigid and static. The visually impaired person can enter an alterity relation with the guide dog as an animal companion; the bar guests can

turn their attention to the wall decoration and observe, hermeneutically, that it conveys aspects of local history; and so forth. Shifts away from embodiment relations are not a sign of malfunction but instead point to the great expanse of clients' experiential possibilities.

Furthering Interface Design in Services

I have thus far described client experiences with service interfaces on the basis of postphenomenological accounts of human–technology relations. The implications of this view when discussing the practice of service design will be addressed next. Bonsiepe must again be acknowledged for providing an acute phenomenological interpretation of design activity. His thoughts on typography design are a good example:

> A typographer designing a book lay-out not only makes the text visible and legible, the interface work also makes it interpretable. Competency in handling visual distinctions like size and type of font, negative space, positive space, contrasts, orientation, color and separation into semantic units makes the text penetrable to the reader. Typographic design is the interface to the text (Bonsiepe 1999, 59).

In another passage, Bonsiepe concludes:

> If language makes reality recognizable, typography in turn makes language visible as text, and is therefore a constituent part of understanding. It could be objected that the production of texts is the primary function. But the hierarchy is less important than the interrelation of two areas that are united under the arch of interpretation and understanding (Bonsiepe 1999, 52).

Bonsiepe contends that designers, in giving shape to interfaces, are able to influence people's understanding and experience of the world. This profound realization of the effect of design owes much to the phenomenological insights commented on in this chapter. Nevertheless, by developing his views in line with Heidegger, Bonsiepe ends up with an approach to interface design that is overly restrictive.

As stated before, Bonsiepe's belief is that interfaces should be

designed to enable the realization of effective actions: handles are to move the scissors' cutting blades (1999, 30); computer screen commands allow easy navigation through data (1999, 53); typography supports the comprehension of texts (1999, 52). In principle, his understanding of action is embracing:

> To assess an action as effective, the implicit standards always need to be identified. To an anthropologist a lipstick is an object for the production of a temporary tattoo, which is applied as part of a pattern of social behavior that we call seduction and self-representation. The criteria by which its effectiveness is judged are very different from those that would be applied to a text editor, a concert poster or a bulldozer used in road construction. There is no point in talking about effectiveness without also stating the scale by which a product is judged as effective for a certain action (Bonsiepe 1999, 35–36).

Nevertheless, in keeping with Heidegger's conception of the ready-to-hand, Bonsiepe characterizes the ideal use scenario as one in which enabling technologies are designed to *always* be withdrawn from the consciousness of the user. This perspective can be observed in his account of the design of an informational CD-ROM:

> It is easy to formulate the function of the interface: it should permit the user to obtain an overview of the contents; navigate the data space without losing his way; and pursue his interests.... It's like looking through a pair of glasses. You don't need to see the glasses—they are the tool for seeing (Bonsiepe 1999, 53).

This approach to interface design seems inadequate even for the practices Bonsiepe selects for a closer inspection. Strictly speaking, we would have to interpret as "design activity" the infodesigner's arrangement of typographic elements onscreen to facilitate navigation, while we would have to overlook her careful placement of an advertising banner among those elements. In the latter case, maintaining that the banner should be "transparent" for users as they click on it to purchase something would

be difficult to support.[29]

The point is that Bonsiepe's approach to interface design is but one of several ways to enable action. Enlarging his approach to design, in general, and extending it specifically to service design requires a reevaluation of his Heideggerian belief that interfaces must be perceptually transparent to be of use to people. Precisely on this point, a postphenomenological perspective to the service interface can offer new insights.

The previous section contained different forms of client interaction with services based on Ihde's account of human–technology relations. From a postphenomenological perspective, the interface needs not always become transparent to be useful for people. In the particular case of services, it is possible to relate back to two examples already provided. A designer striving to perfect the embodied relation between a guide dog and its user may well devise a new leash that improves maneuverability without drawing much attention to it. However, in the case of the alterity relation identified, a designer could change the uniform of the skiing instructor to highlight his bodily demonstration. In the latter example, making the instructor's body stand out more (and thus be less "transparent") may facilitate the learning of skills by beginning students and sustain the fantasy that they will soon move as effortlessly as the instructor. This expanded approach more accurately accounts for different types of service experiences and is better suited for designers because it acknowledges the wider scope of options available when creating useful interfaces.

In sum, a postphenomenological approach to the service interface acknowledges the effect of interfaces in shaping clients' understanding of the world and the self, yet proposes a more nuanced framework with which designers can think about the kind of experiences they wish to make possible for people.

---

29. The narrowness of Bonsiepe's approach to the interface was also noted by Anceschi (1992, 19–21). In contrast to situations where the interface transparently enables action, which he sees as Bonsiepe's predilection, Anceschi argues that there are occasions in which the interface enters a "dialogue" with the user, who thus becomes the recipient of some form of knowledge. An extreme formulation of this alternative type of interface experience, he says, would be analogous to the oneirism created by watching cinema. Anceschi, however, does not challenge Bonsiepe's Heideggerian standpoint, as I do in this chapter.

Rethinking Design through the Service Interface

By placing the interface concept at the center of design theory and practice, Bonsiepe has developed a phenomenological perspective on design that has much to offer. For him, design ability should not be restricted to the traditional disciplines but is extendable to other domains of human activity—although not without careful observations. He writes:

> There is a risk of falling into the trap of vague generalizations like "everything is design." Not everything is design, and not everyone is a designer....Every one *can become* a designer in his special field, but the field that is the object of design activity always has to be identified....The inherent components of design are not solely concerned with material products, they also cover services. Design is a basic activity whose capillary ramifications penetrate every human activity. No occupation or profession can claim a monopoly on it (Bonsiepe 1999, 34–35).

In this thesis, the application of the interface concept in service contexts comes in the same spirit of fostering a penetrating interpretation of design, unambiguously grounded on a particular object of study and a field for expertise development. Bonsiepe has constantly relied on the interface concept for vindicating design expertise in relation to other disciplines, in particular, engineering:

> The concept of interface will help to explain the difference between engineering and design, insofar as both are design disciplines. A designer looks at the phenomena of use with interest that focuses on socio-cultural efficiency. Categories in engineering do not include user functionality; they are based on the idea of physical efficiency that is accessed through the means of the exact sciences. Design, however, builds the bridge between the black box of technology and everyday practice (Bonsiepe 1999, 36).

Pacenti, who advanced the interface concept as a bridge between the design and service discourses, has a strikingly similar position:

> The adoption of conceptual tools borrowed from interface design allows to get closer to an approach in which the service's

> organizational structure runs in the background, as with the engineering of a technical object, in order to leave space for the theme of designing not only of its technical qualities, but also cultural ones (Pacenti 2004, 159, my translation from Italian).

Although it would be possible to react against the technicist portrayal of engineering, design's contribution to the social fruition of technology is unquestionable. However, inasmuch as the interface may be helpful to consolidate the domain of design expertise, it also prevents the permanent fixation of this practice. Within the domain of services, it is necessary to consider the productive activities of many professionals who create new user interfaces but are not traditionally seen as designers. Indeed, on basis of the examples discussed before, it is possible to acknowledge a wide range of practitioners: the trainer of dogs behaving as guides for the visually impaired; the helpdesk employee who answers clients' questions with expert advice; the ski coach who perfects the display of his skills for beginners; and the manager who optimizes the bar's resources to prevent overcrowding. Insofar as they all contribute to structuring service experiences for users, can these practitioners be considered designers as well? The interface concept presents an opportunity to reflect on the evolving meanings of design in a world highly saturated with the exchange of services.

Chapter 3
Creating Healthy Clients: The Use of Philips DirectLife[30]

The present chapter pursues the projective line of inquiry specified for this thesis in the introduction. Following the lead of Pacenti and Bonsiepe discussed in chapter two, I analyze the interface of a service that sits close to a domain of traditional design expertise—a service based on interactive technologies.

The dependence of service design on concepts, tools, curricula, and other influxes coming from the discipline of interaction design is well documented.[31] However, service design has also been portrayed as evolving on its own by challenging basic assumptions coming from that same discipline.[32] Specifically, there is a growing movement in service design research to break away from an interaction design heritage by reacting against an approach that is overly centered on the interface. Morelli (2009, 5), for example, laments that the design of interfaces overlooks decisions regarding the "back-office" of services. Singleton (2009, 4307–4308), on the other hand, believes that current views on the design of interfaces are limited to "logistically-complex" services mainly consisting of interactions with technological devices. And Cipolla and Manzini (2009, 49–50) caution that the interface concept must not delude designers into thinking that service relations should be completely predetermined by them.

This chapter scrutinizes one such current moving service design away from a focus on the interface. The current in question is based on the belief that the interface concept does not adequately convey the social dimension of services. This position was initially articulated in Sangiorgi's (2004) doctoral thesis, but it has since attained some consensus among other researchers, most of an Italian origin. The Italian debate about

---

30. Chapter based on Secomandi (2012).

31. E.g., Holmlid (2007); Maffei et al. (2005); Mager (2008); Meroni and Sangiorgi (2011, 16–17); Morelli (2009); Moggridge (2007, 383–447).

32. E.g., Blomkvist, Holmlid, and Segelström (2011).

service interfaces, however, lacks an extended treatment in English and remains poorly known by the design community at large.

The following section presents an introduction to the aforementioned debate, framed as a critique to what I see as an inappropriate way of conceptualizing the interface in service design discourse. To this end, I revisit once again Pacenti's contribution to discuss shortcomings with her analogy with the field of interaction design, as well as with Sangiorgi's criticism of her approach. Based on the postphenomenological perspective on service interfaces introduced in the previous chapter, I contend that the experience of material interfaces *does* enact the social dimension of services. To substantiate this point, I draw on an in-depth study of a service recently launched by Philips, called DirectLife.

DirectLife is a technological system devised to help people become more physically healthy, which includes as service interfaces an activity monitoring device, a supporting website application, and personalized e-mail contacts by human coaches. As such, it is an exemplary case of a service embodying the notions of ambient intelligence and persuasive technology, referring to those situations where miniaturized and networking technologies are purposefully designed to influence people's behaviors. As recently argued from a postphenomenological standpoint by Verbeek (2011), the impact of such technologies on human experience can be pervasive, and this raises important questions regarding the design decisions made during their development.

Technologies like DirectLife are increasingly being used in the service sectors in areas of transportation, healthcare, education, etc. Examples mentioned in Verbeek's book, but not necessarily acknowledged as service cases, include ticketing systems that automatically charge for trips in public transport, alarms installed in the houses of elderly people to monitor eventual falls, life-sized dolls with programmed responses that are used to educate children about the responsibilities of parenthood, among others. In these applications, more than situating people in relation to an interactive artifact, interfaces mediate the interactions among clients, human providers, and other social actors. Therefore, DirectLife presents an opportunity to reflect on the experience of services in cases where the social context is particularly poignant.

Beyond the Service Interface?

Pacenti was among the first within the design community to show how designers could build on their extant expertise for creating new service interfaces. However, it is uncertain to what extent she has successfully secured the concept as the central object of design in services. This uncertainty, in my opinion, is partly justified by Pacenti failing to notice how Shostack highlighted the role of tangible evidence in services, and yet made it peripheral in her service model. Thus, while Pacenti might agree with the proposal found in chapter one of this thesis (that the experience of material interfaces *is* the service), she also describes interface materials as mere "enablers" of service relations.

In the previous chapter, I showed how Pacenti's approach to the service interface was informed by previous ideas in the area of interaction design. However, a careful interpretation of those ideas has the interface defined in two different senses. In the *expansive* one, of Anceschi, the interface is the "domain of interaction" including users and technologies. In the *narrower* sense, which Montefusco subscribed to, the interface is the "inert" object that is independent from users.

As noted before, Pacenti adopted Montefusco's notion of the interface as a "potential event." And she stressed this notion by observing that the inclusion of human providers in the service interface increases the variability of the event's performance, when compared to that of an interactive technology. This leads Pacenti to stipulate important limits on how the service interface may be manipulated by designers:

> First of all, it is important to note that the nature of the potential *performance* of a digital or communicative artifact can be entirely "inscribed" in its program of use.…The presence of a human element (the service operator or operators) in traditional service interfaces involves a higher variation margin in the realization of the potential *performance*.…The physical evidence components of a service "materialize" and contain (in a form that we could term static) the program of gestures and the instructions that guide the user's action. What cannot be encoded and pre-programmed is the behavior of the personnel, i.e. the human element (Pacenti 2004, 160–161, my translation from Italian).

Pacenti writes that the human component of a service interface cannot be specified, at least not as directly and definitely as in the case of the "physical evidence." As a result, she adds, the design of interfaces must be approached as predisposing a "series of possible performances" and providing "support" for service relations (Pacenti 2004, 160). In effect, Pacenti is suggesting that designers may manipulate the service interface *in the condition of* a narrowly construed material object. As such, her approach to service design is open to the criticism of relegating to a second plane the social dimension of service exchange. As seen next, Pacenti's approach is undermined by Sangiorgi on similar grounds, although by taking an alternate route.

Following Pacenti's lead, Sangiorgi (2004) expanded the interaction design perspective to services with a focused study of the management literature on service encounters, followed by detailed readings in the area of activity theory.[33] She forged a theoretical synthesis of these two literatures in the form of the service "encounter model" (Sangiorgi 2004, 83–100). According to this model, a service is generated in encounters between activity systems of users, providers, and possibly other stakeholders who coproduce it.[34]

While Sangiorgi's views on service design agrees with Pacenti's position in important ways, especially in characterizing services as coproduced by clients and providers, she departs from Pacenti by questioning the centrality of the interface concept. Her position is demonstrated in a text co-authored with Maffei, where the service encounter model is described in an empirical context (Maffei and Sangiorgi 2006). The application case is the design of a pay-per-use washing machine service (PXU), consisting of two possible scenarios for the service encounter: one, during installation, when users engage immediately with the technician, and the other, in daily usage, when users interact mainly with the contact center. In both cases, Maffei and

33. Sangiorgi's PhD research, also carried out at the Politecnico di Milano, was supervised by Pacenti and includes extended commentary on the latter's work.

34. On basis of the service encounter model, Sangiorgi (2004, 105–233) also extended Pacenti's work in the direction of more sophisticated design guidelines and tools that sit outside the scope of the present analysis.

Sangiorgi point to the interface as the technology connecting users to the service provider:

> PXU is a mediated service, where users interact with the supplier mostly through artifacts (washing machine, telephone, etc.), and where the service encounters tend to coincide with the users' interactions with the interface of the artifacts themselves (Maffei and Sangiorgi 2006, 89).

Keeping in line with Pacenti, the authors elaborate on the role of the service interface, stating that it mediates between the user and "his or her action possibilities" (Maffei and Sangiorgi 2006, 84) and is the "physical device around which the service space is materialized" (Maffei and Sangiorgi 2006, 90). At the same time, however, they hold that the interface cannot convey an understanding of the whole service:

> ...[the PXU] cannot be in fact imagined focusing exclusively on the man-machine interaction, as it is actually supported by the wider service Activity System....of which the washing machine is just a part (Maffei and Sangiorgi 2006, 93).

This assertion reflects the position expressed in Sangiorgi's thesis, that it is necessary to go beyond the specific encounter in order to understand how services are experienced:

> The quality and the perception of the *service encounter* depend also on factors that transcend the moment and the place of the *encounter*, as for example the personal characteristics of actors (experience, motivations, expectations, etc.), or the organizational....and social-cultural environment in which the action takes place or with which the actor interacts (for example, through organizational rules or social conventions) (Sangiorgi 2004, 3, my translation from Italian).

Sangiorgi (2004, 31–33) concludes that Pacenti's approach to service design is limited to the "one-to-one" (client-interface) encounter, without integrating the "sociocultural world" that embeds the interaction. This is a line of argumentation that reduces the service interface to an inert, self-

contained, asocial material—a limited perspective on services, indeed. The conclusion is never challenged thereafter, and a certain degree of closure ensues around this narrow perspective on service interfaces. In a joint publication by the exponents of this debate, for instance, Sangiorgi's work is portrayed as a contribution to widening the object of service design beyond the interface (Maffei et al. 2005, 59).

Without wanting to oppose the importance of contemplating the sociocultural dimension of service experiences, I hold that designers need not move beyond the materiality of interfaces in order to take account of it. Such a movement would appear to run counter to the fact that services are ultimately experienced through means that are available to bodily perception. What designers need, more than acknowledging the sociocultural "world" that influences the experience of services, is an explanation of how this world is constituted for clients exactly in interaction with interface materials.

A postphenomenological perspective on the service interface can offer such an explanation. In addition, postphenomenology can help to deepen the present understanding of how services are experienced by people. When getting in contact with a service interface, that does not just mean that an exchange between preexisting entities of providers and clients is enabled. More than that, the service interface helps to configure people's roles as providers or clients, and at the same time transforms their experiences of reality in important ways. The forthcoming analysis of DirectLife provides rich empirical detail about the complex ways in which services and people are co-created in interaction.

Using the DirectLife Service: A Postphenomenological Study

Introducing Philips DirectLife

DirectLife is an innovative service commercialized by Philips to help people attain healthier lifestyles by becoming more physically active. The concept revolves around the activity monitor (Figure 3.1, foreground), which is a device employing accelerometer technology to estimate human energy expenditure. When properly worn by a person on a daily basis, the device can accurately measure caloric burn associated with different types

of physical activities. After plugging the activity monitor to a computer installed with dedicated software, these measurements are uploaded to a website application (Figure 3.1, middle), where users can monitor their registered activity patterns and follow instructions on how to become more active. This website also contains a 12-week activity improvement program that sets progressively higher targets to be reached by DirectLife clients on a weekly basis. In addition to using the activity monitor and the website, clients also receive automatically generated e-mails with weekly summaries of their achievements, as well as personalized support by a human coach for via e-mail (Figure 3.1, background).

DirectLife is one of the first consumer-oriented market offerings of Philips after a recent company-wide reorientation of the brand toward the areas of health and well-being (Philips 2008). The design of this integrated offer is intended to motivate people to achieve long-lasting changes in physical behavior, by relying on a technological system that is

Figure 3.1. *The DirectLife service interfaces.*

partly automated, yet flexible enough to deliver support as efficacious as one-on-one coaching (Lacroix, Saini, and Goris 2009). By these means, the DirectLife service holds the promise of performing "mass interventions" in widespread sedentary lifestyles, by helping people to attain healthy levels of daily activity as set by the World Health Organization (Lacroix, Saini, and Goris 2009).

Methodology

The adoption of the postphenomenological stance to analyze the use of DirectLife entails performing an in-depth examination of the embodied interaction of clients with its material interfaces. According to Ihde, one way of doing a rigorous phenomenological analysis is by relying on own personal experiences. Yet, contrary to a common misconception about this inquiry method, Ihde (1986a, 21–24) holds that phenomenological investigations are never naïvely "introspective." A postphenomenological analysis may start with what is immediately evident in personal experience, but only as an index for probing into the possible meanings of phenomena, including those that are socially shared. The very idea of introspection, as relying on a purely "subjective" knowledge domain, springs from the exact ontological commitments that phenomenology has set itself against. As Ihde has repeatedly shown (e.g., 1986b, 181–198), key figures of the phenomenological movement rejected a conception of human existence that presupposes a gap between the "external" objective world and "self-contained" perceiving subjects. Postphenomenology, being in line with this general phenomenological standpoint, undercuts any strict separation between humans and technologies, proposing instead a relational ontology founded on their aprioristic entanglement. Thus, according to postphenomenology, all possible knowledge, including "introspective" knowledge, is essentially *intersubjective* as well as *interobjective*.

In order to obtain insight into the experience of using DirectLife, I became a regular client of this service for the whole duration of a 12-week activity improvement program. Additionally, a usability study was organized with six volunteers recruited from a Dutch university. The study ran between the months of July and August of 2009, with participants

coming from different faculties and countries (The Netherlands, India, and Iraq). The group consisted of two secretaries, three PhD candidates, and one member of the ICT staff, aged 28 to 53 years old. Half of the group was male, and the other half female.

Differently from other DirectLife clients, these participants were asked to follow the program for as long as the study lasted and told that continuation afterwards could be negotiated directly with Philips. They also sidestepped the weeklong period after registration that regular clients have to wait before receiving their activity monitors by post. The volunteers provided weekly feedback by e-mail on open-ended questions regarding their daily experiences. At the end of the study, interviews were conducted with everyone to explore personal opinions in greater depth. These interviews were transcribed verbatim by an externally hired student assistant and imported together with the weekly feedbacks on the Atlas.ti software for qualitative data analysis.

The analysis of this data started with closely reading the interviews and creating the codes to classify the content. These codes were primarily informed by what was explicitly conveyed in the interviews, varying from fragments of sentences to entire passages, at times containing one or more paragraphs. This coding procedure was intended to provide a broad overview of all topics covered in the interviews. When references were made to content discussed elsewhere, such as in the weekly feedback or the website pages, those were carefully inspected as well. Preliminary interpretations of these sources were written as separate notes in the Atlas.ti software, running from brief sentences to a couple of pages. These interpretations were inspired by different bodies of literature under the purview of my doctoral research and suggestive of topics that could later be explored as being relevant to that same literature.

The subsequent steps in data analysis were carried out in parallel with writing the findings from this empirical research. Specifically for this chapter, concepts coming from the literatures on service design and postphenomenology aided in interpreting the data that was coded in Atlas.ti. The previously created codes, then, provided a useful index for returning to the "raw" interview data and reevaluating the coded content, resulting in interpretations that will be presented next.

The Co-Constitution of Clients and Service Interfaces

After subscribing to the DirectLife program and carrying the activity monitor in the assessment week, during which baseline levels and activity targets for the improvement plan are estimated, clients logon to the website for the first time. This initial analysis highlights the interpretation of the website interface and the clients' correlated perception of their situated standpoint. From a postphenomenological perspective, DirectLife clients and the service interface cannot exist independently of each other; they are *co-constituted* in interaction, as the following case demonstrates.

Immediately after launching the Internet browser application, the webpage known as the "dashboard" appears (Figure 3.2). The green circle dominates the perceptual field against a photographic image and other graphic elements. This illustration actually belies the process of focalizing the circle—the background forms first, followed by a popping up circle with numbers counting up to ninety-six percent. That counting in this case stops precisely at "96%", and does not reach or exceed one hundred, already suggests something that is short on totality. But the interpretation of this fraction as an almost reached activity target is only grasped due to the proximity of "995 Cal" and "yesterday's achievement." The latter term further indicates that the percentage and calorie sums refer to a previous moment in time, namely, the day before today. This temporal quality of experience is underlined by the bottom white part of the circle containing "today's achievement" and related items.

Turning to the background, the image shows a young man in a natural environment. The panoramic display enacts a cinematographic experience. The landscape, the sunlight's tone and incidence upon the man's face, his sportive outfit and absorbed demeanor—all of these convey a pleasantly strenuous activity happening outdoors, under mild climate, during sunset or sunrise. As long as the image is not repulsive, it is possible to empathize with him and vicariously sense the external location, the feeling of action, and the recompense for being physically active. The person depicted is obviously not *me*. Yet, he is me in some imaginative sense, when last exercising outdoors or, perhaps, in an upcoming travel abroad.

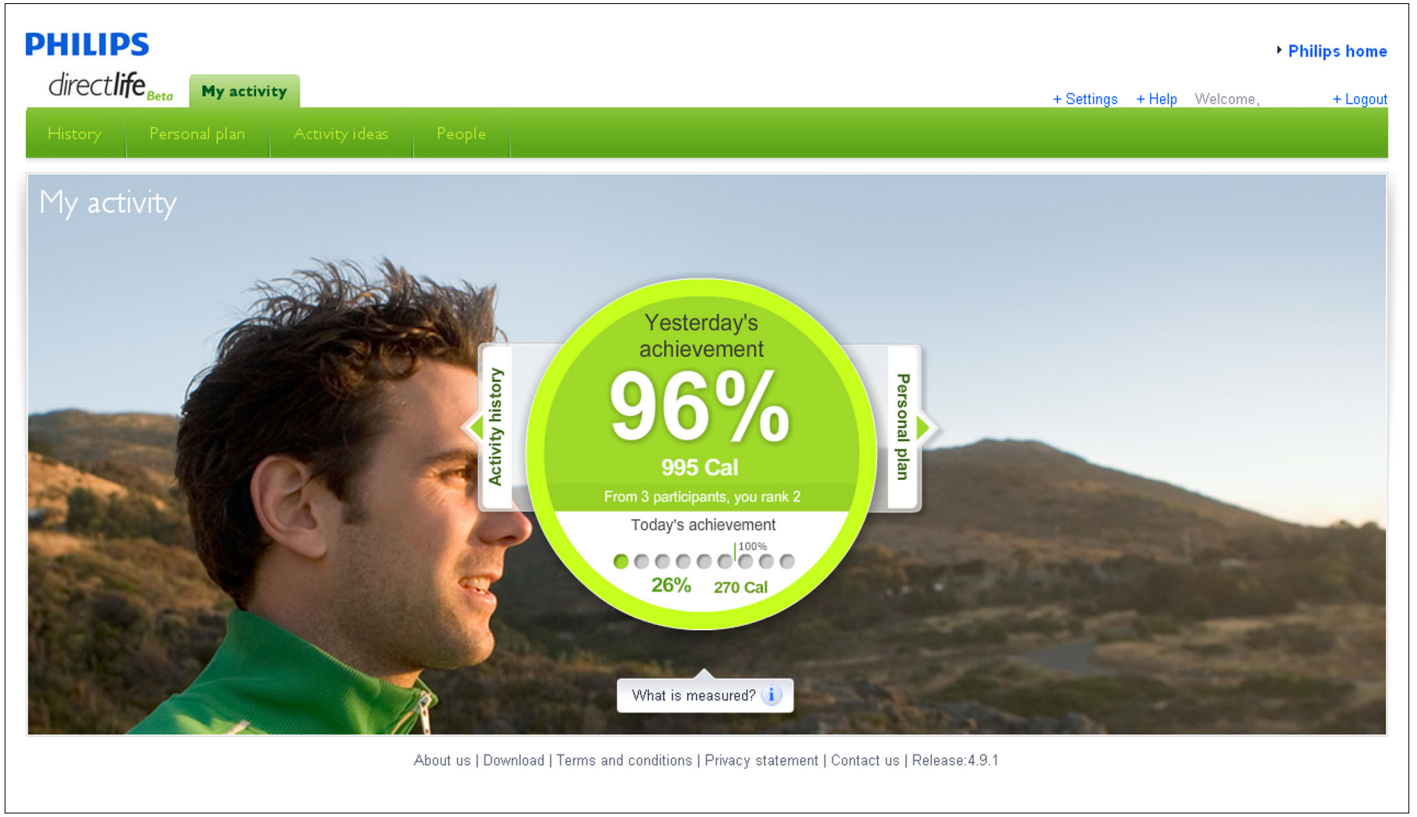


Figure 3.2. *Screenshot of the dashboard interface.*

It is already noticeable how the experience of the dashboard webpage reflexively evidences the bodily position of a client at the present moment, sitting inside, in front of the computer, staring at the screen. Postphenomenological descriptions are characterized by this focus on physically situated perception—but embodied experiences are situated in cultural-historical ways too. For a long time Ihde has claimed that bodily experience is necessarily informed by culture at the most basic level of sense perception. In a famous case regarding the use of technological instruments, for example, Ihde (1990, 42–71) argues that Galileo's discovery of celestial phenomena through the telescope is informed by culturally acquired ways of experiencing time and space.

Returning to the more modest case discussed here, years of education are necessary for comprehending readings of bodily activity from such symbols as the numbers and letters appearing on the dashboard. In addition, as a regular user of computers with considerable expertise with other Internet-based services, upon seeing the DirectLife webpage, I bring along previously learned ways of interacting with it. The webpage is not simply "there" as an anonymous collection of graphical elements. Every element of it has been designed by someone else and made available for me to take action upon.

The biggest clue for this "other" that inhabits the service interface is, of course, the Philips and DirectLife logos at the screen's upper-left corner. The surrogate presence of these organizations through their visual brands confers authorship and authenticity to the webpage. Philips is a reputable innovator in the field of electronics, and they stand behind DirectLife's communication. Therefore, I am inclined to accept the dashboard's readings of my activity levels. Furthermore, the very discernment of distinct "regions" in the webpage is impregnated by the socioeconomic context of our relation: appearing at the center is what the company finds most valuable for me to know; the header at the top left proposes navigation options in some pre-defined order of relevance; the footer offers clarifications about the service provider, including our implicit contractual agreements. In short, I interact with the dashboard webpage not just as an incarnate being; the service interface configures me in the role of *client* in a particular exchange relation with the provider, i.e., DirectLife.

The Experience of Service Infrastructures through the Interface

While describing the focal features of the dashboard webpage above, it was already possible to note how embodied experience can extend beyond what is immediately apparent onscreen to that which is experienced "through" it: an outdoor environment, previous bodily behaviors, the Philips DirectLife organization, and so forth. This structure of human experience whereby material artifacts refer to a "world" beyond themselves is in postphenomenology known as a process of *technological mediation*.

As mentioned in chapter two, Ihde holds that the seminal phenomenological explorations into the structure of technological mediation were done by Heidegger. Heidegger departed from one of Husserl's finding, that what appears to consciousness always does so against a "background" or "field," and argued for the existence of a similar figure-ground relation in the experience of material technologies.

By examining the mediating character of the DirectLife interface, it is possible to describe in greater detail the complementary domain of experience that is revealed through it: the *service infrastructure*. In chapter one of this thesis, I have defined this infrastructural domain as comprising the sociotechnical resources that are indirectly related to service exchange and actualized through a material interface. What follows is a postphenomenological description of the strictly indirect, yet indispensable role of the service infrastructure in generating the complete experience of the DirectLife service.

I proceed by clicking on the left tab of the dashboard circle (Figure 3.3). This has become such a routine performance that it really obscures what the action of clicking can reveal. Strictly within the visual field, the cursor travels from somewhere on the screen to the top of the activity history tab. This seemingly effortless action requires having moved the mouse across the table's surface in an isomorphic trajectory to the one intended for the cursor onscreen. This accomplishment, by itself, depends on previously acquired eye-hand coordination abilities hinging on the learned association between the arrow pointer at the screen and the handheld mouse on the tabletop.

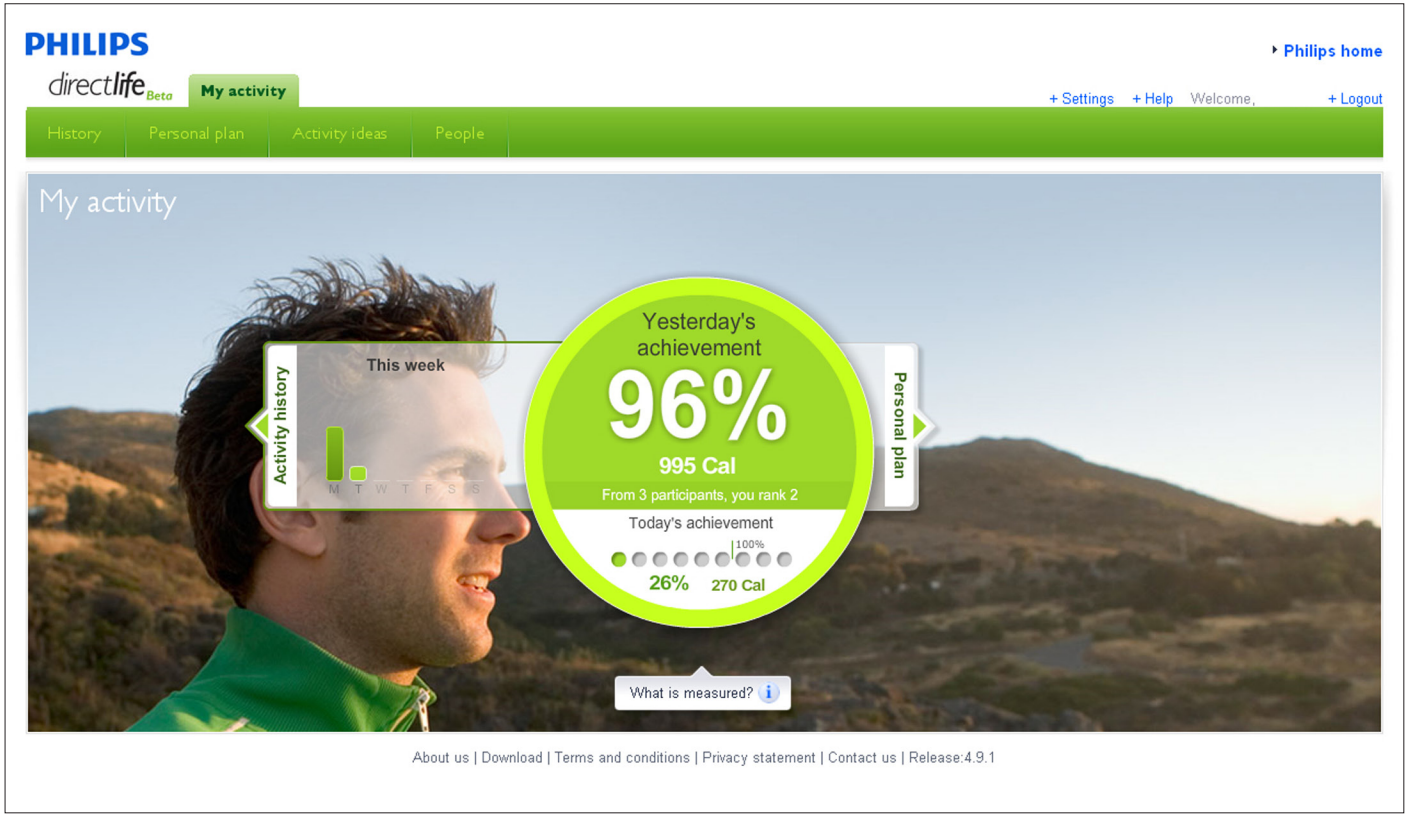


Figure 3.3. *Screenshot of the dashboard's activity history tab.*

When reaching for that tab, the mouse, the table, my honed skills and learned symbols—these are aspects of my experience of the DirectLife service. But insofar as they are indirectly revealed to me through the service interface, they constitute an infrastructural domain of the experience. (I note that while attending to the mouse directly, the experience is primarily *not* of DirectLife, but of an interface with the personal computer. In this shift, though, it could be argued that the DirectLife website is relocated to an infrastructural domain of experience.) As the action of reaching for the activity history tab reveals entities closely associated with or belonging to me, this aspect of the service infrastructure is predominantly local and private. However, it is possible to discern another dimension of the DirectLife infrastructure that is more spatially distributed and socially constructed.

After clicking on the activity history tab, a moment elapses and the tab is "pulled" to the left, displaying its hidden content. Considering that the website is online, I am aware that personal data has been fetched from a database located somewhere in the globe and accessed via a networks of cables, routers, modems, data communication protocols, etc. This networking infrastructure exposed to me in the fraction-of-seconds between screens is partly controlled by DirectLife. What makes these aspects of the infrastructure related to the experience of DirectLife service, specifically, is their disclosure through the dashboard interface. But only to the extent that these aspects are revealed by the dashboard interface do they constitute part of the DirectLife service infrastructure. Many other times, the same networking network may be revealed to me as part of other service relations, for instance, with my telephone and Internet provider.

The Non-Neutrality of Service Interfaces

An important contribution of postphenomenological research is to have identified nuanced forms of human-technology relations (i.e., embodiment, hermeneutic, alterity, and background). As discussed in chapter two of this thesis, these same relations can be applied as a way to describe how clients experience the material interface of services.

This subsection presents an analysis of the history view webpage, an interactive visualization that provides DirectLife clients insight into their recorded levels of physical activity (Figure 3.4). The history view is one of the most frequently used DirectLife interfaces, especially during the first weeks in the program, when it is accessed more than once per day. The experience of the history view presents a case of a *hermeneutic* relation, which is when people rely on their interpretative capacities to "read" through technologies some aspect of the world. As argued below, through the history view the bodies of DirectLife clients become aspects of the service infrastructure that are experienced through the website interface and transformed by it. While the analysis thus far has been based on my personal experiences, I now take into account the opinions of other participants of the usability study.

One of the first actions that these participants reported was to search for groups of adjacent bars that denote moments in the day they remember being particularly active. The history view provides readings that dispel any vagueness that might be associated with the specific time and intensity of past bodily behavior. By navigating to the hour tab, which depicts physical activity on a minute basis, readings become ever more precise. One participant describes her pattern-looking behavior:

> I look at the pattern of the day and the high scores, and then I check, "Oh, here I was cycling home, I know that, and here I was cycling to work." And around lunchtime I usually have a peak, because I go downstairs to get lunch. And sometimes I check the more precise schedule. So, this [hour-level] is the most precise level that you can get at, and here I was probably walking the stairs or something.

As seen in her commentary, whole moments in the day (lunchtime) can be dissected through the history view into discrete events (walking up/down the stairs) with associated activity levels. But the history view does more than merely represent memories of active and inactive behaviors; it can also produce novel occurrences in someone's life. As long as clients uninterruptedly carry the activity monitor, the history view will display measurements associated with all activities, even those that might have

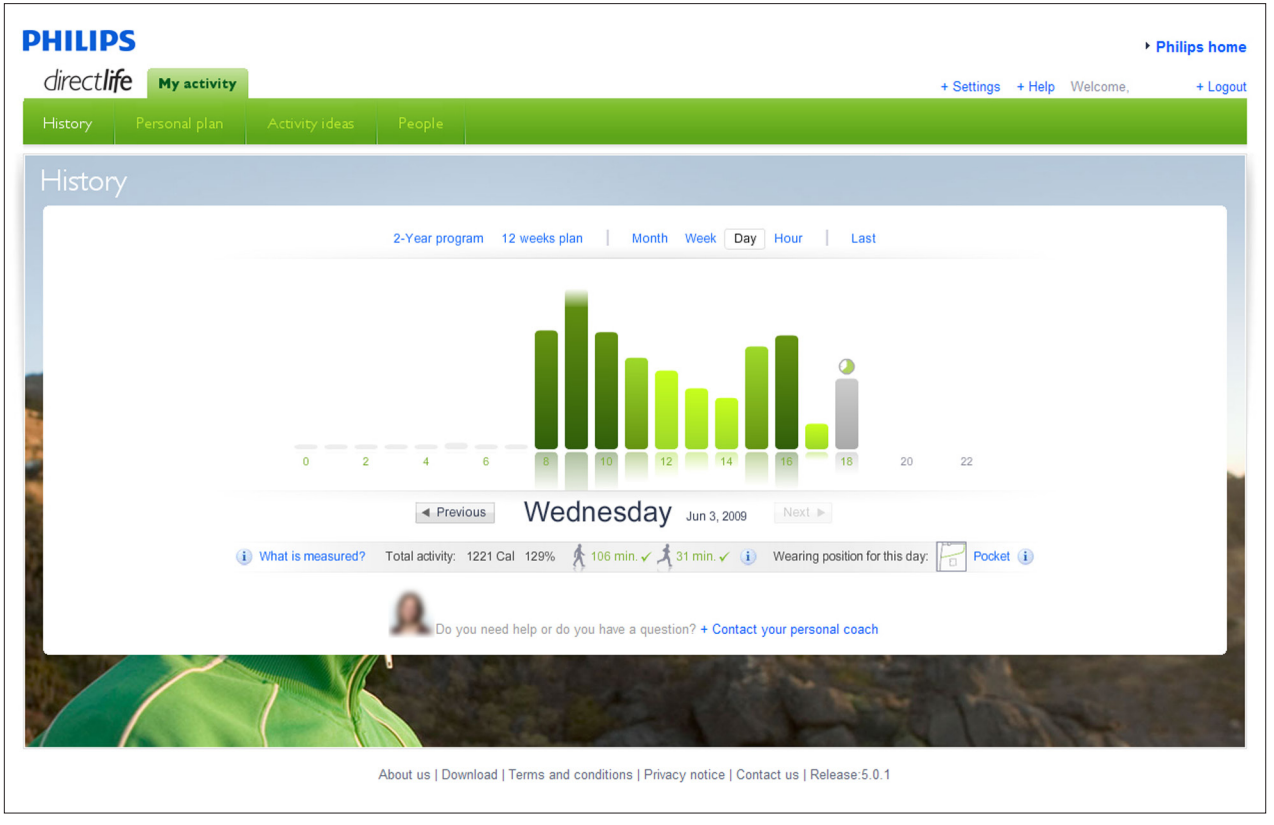


Figure 3.4. *Screenshot of the history view interface.*

passed unremarked. Even just walking somewhere becomes an explicit action that can contribute more or less to a healthy lifestyle. A participant recounts:

> I went one time to The Hague. And from the train station I had to reach a café within five minutes. So, I was walking really quickly. And after that we went around the city, so, walking normally. And then you can see….that in this half an hour you are walking very quickly [to the café], the activity levels are very high. But, [walking around the city,] even though [I was] walking as well, the activity level is very low.

Because feedback is comprehensive, available every instant and around-the-clock, and because clients depend less on estimations by themselves or other people, the history view commonly affords readings of physical performance that are deemed more objective.

> It's continuous monitoring. You can have a coach in a fitness center that sees you once a week, and asks you some questions, and you don't remember anything… You get some advice… But, when you see the result yourself on the website—like, I stopped coming to work since last Friday, and I noticed that my activities have dipped, and that I'm spending less than 500 hundred calories a day. So, usually I would think that I am not doing much at work and I am also doing stuff at home, so that is the same thing. And you would also say that to a trainer, if he asks you. But with this device it is very clear that when you are at home you are not doing as much. So, maybe you should exercise more or do something else.

From a postphenomenological standpoint, all technologies transform human experience in non-neutral ways. One of Ihde's (1979, 16–27) long-held claim is that technologies oftentimes transform human experience by augmenting some aspects of the world to experience while simultaneously reducing others. However, he underlines, the transformations performed by technologies are essentially ambiguous, not necessarily good or bad. At best, mediating technologies incline people toward certain behaviors

but never fully determine them.

The history view interface makes clients' bodily behavior better demarcated, measurable, and accountable for. This transformation is one of the powerful features of DirectLife influencing clients to adopt more active behaviors. To conclude that the history view determines clients' experiences of their bodily condition, however, would mean to overlook their active participation in the program and the deliberate choices made. The next subsection covers some of the negotiations taking place between DirectLife interfaces and clients in the process of co-creating healthier bodies.

The Accommodations between Clients and Service Interfaces

One reason why DirectLife clients do not settle immediately with the version of their bodies depicted by the history view is that such visualizations are rarely perceived to be transparent. The history view, as people are acutely aware, shows activity patterns *as measured by the activity monitor*. In order to provide accurate readings, but also to create more flexibility in use, DirectLife offers four positions for wearing the activity monitor: inside the trousers' front pocket, hanging from the neck (necklace is included in packaging), around the waist in a belt pouch (also included in packaging), and, when cycling, inside one's sock.

Some participants of the usability study spent considerable time working out an acceptable equation between themselves, the activity monitor, and the different wearing positions. Occasionally, the adaptation concerned issues of comfort and fashion. More often than not, the key motivation was to understand better how measurements were made in various usage circumstances. At times, the activity levels displayed by the history view were simply incongruent with what participants felt to be their actual achievements.

> Sometimes, when I cycle, I put it in my shoe. Cycling is not that exhausting, then it measures too much, I feel. And when I don't have shoes that I can put it in, I wear it in my pocket. And then it hardly measures anything at all.

To obtain satisfactory readings of activity levels, DirectLife clients must therefore learn to conceive of the body that is conveyed through the

history view interface as a hybrid entity: partly own body, partly activity monitor. The "incorporation" of technologies as a part of bodily capacities is normally treated in postphenomenological studies as a relation of *embodiment*. Having stated that, when actually using the activity monitor, clients apparently engage in a *background* relation with it. In this type of relation, technologies are not exactly "in-between" humans and world, but their influence is felt from a peripheral or contextual position.[35] Some users of DirectLife described their experience of the activity monitor as having a "back-of-the-mind" character. As one explained:

> I am not aware of wearing the thing. But in the back of your mind, you are aware of the fact that, if you have to plug in the evening and you didn't do anything, it's a pity. You know, because it registers everything. And I think that when you are so used to wearing the thing, at the end you are accustomed to the way you behave and move every day. So, you don't need it anymore.

From the quote above, it is clear that the activity monitor can influence clients' behaviors from a contextual, barely noticeable position. In fact, this participant was able to assimilate this influence into her normal conduct to the point that using the device was, perhaps, not necessary anymore. Yet, however deeply ingrained the transformation operated by the activity monitor might have been, this influence was still recoverable as an artifact in her daily experiences.

The majority of DirectLife clients start the program in a sedentary condition, which means that their foremost objective is to reach the

---

35. Ihde (1990, 108–112) has similarly described clothes as a borderline case between embodiment and background relations, because of the "fringe awareness" one commonly retains of them in wearing circumstances. He has also characterized background relations as those were technologies are "presently absent," as with the case of semiautomatic technologies (thermostats, washing machines, etc.) that are set to operate independently of the user, in the background. If I am right in this portrayal of the activity monitor as taking part in a background client-interface relation, new light is shed onto a controversy in postphenomenological studies. As noted in chapter two of this thesis, some researchers state that embodiment and hermeneutic relations are the primary cases of technological mediation. This belief comes in spite of Ihde's (1990, 112) position that the influence of technologies from a background position, although subtle, does occur and is similar to the other forms of human-technology relations.

targets set in their activity improvement program. In the beginning, at least, people may already notice an improvement in recorded activity levels by simply experimenting with the activity monitor in different wearing positions, without necessarily engaging in more active behavior. Some even devise stratagems for "winning" in the program, for instance, after realizing skyrocketing activity levels when the activity monitor was machine-washed inside their trousers. One participant reported lurking desires to tweak the technology:

> What I did for the last week was, in the lunch I would go and do something in the city by bicycle….Maybe I did that also because I had this thing, so I would get a better score. I am quite competitive, I guess. I see it as a score (laughing)….And, also, I felt that I wanted to understand this machine, how it ticks, how it works, how I can turn it on. Was this a trick? I don't know….I think it works really well if you put it in your shoe. Then, it measures really high activity. But, of course, it's cheating if you would put it in your shoe all the time….I thought about wearing it in my shoe the whole day once, but I never did that…. Maybe I just felt that I would know the result already, that really high activity level.

As this user realizes, playing with the device in her shoe might have led to immediate satisfaction with activity levels, but without decisive gains in terms of physical health. In addition, she indicates how pointless the action would be even if only to get better acquainted with the technology, since the result could be estimated in advance.

For most participants the usability study was seen as an opportunity to engage more intensively in sportive activities, like going to the gym, swimming, cycling, and so forth. DirectLife suggests through its many communications that greater levels of physical activity do not require individual adherence to intensive sports. The tips offered by the personal coaches, or found on the website, explain that remarkable increases in activity levels are possible with modest changes in daily activities. These tips often emphasize the social context: getting coffee for friends from a machine further away from your working space, inviting

colleagues for an after-lunch walk, picking up your children at the bus stop, etc. The concluding part of this study examines the impact of the DirectLife interfaces on the social relations of clients.

The Impact of Service Interfaces on the Social Self

Registration in the DirectLife program does not normally go unnoticed to the clients' family, friends, or colleagues. The involvement of these people might be punctual at times, but often carries more important social consequences. One participant, for example, repeatedly noted how the activity monitor mediated conversations with his colleagues at work:

> You are always talking to people about it….and someone else says, "What are you talking about, I don't understand?" I say, "Oh, 'cause I am wearing this sensor thing, and this is what it does, and it gives you this activity level…" Most people who hear about it, and see it, say that it is something they find… something they would also like to have or participate in. Usually, the reaction is positive….Like the iPhone I have, and some people say, "Oh, an iPhone, not that good, too expensive, or just for people that are fashion oriented"….But you don't get this kind of negative reaction to this device. So, it seems to be socially accepted, I'd say.

This quote points to the activity monitor's contribution to the formation of social stereotypes. Such an impact may occur by merely registering in the DirectLife program and carrying the monitor, without necessarily taking any actions to improve physical behavior. When the decision is to really become more active, even minute behavioral changes can significantly affect the social identities of clients. The reflections below, which refer to the tips found in the website, are particularly telling in this respect:

> And then they suggest you walk to another coffee machine [further away from your computer]. But, I don't know, I don't really feel like doing that, because it is too awkward. That you go to another department and then you meet all kinds of people, and they, "What are you doing here?", "Uhm, yeah, I am just walking more…" (laughing) I don't know, it's not something I

> would easily do….I'm really busy. So, actually I want to get back to my computer again as soon as possible, because I want to keep on working. I know a lot of people in the building. So, when I would get coffee at another machine, I would have to talk to those people. Of course, that can be nice, but I don't always feel like that….That sounds a bit negative, but it is troublesome.

The impact of DirectLife interfaces on the constitution of the social self is perhaps strongest in the case of coaching e-mails. From a postphenomenological perspective, coaching e-mails create a *hermeneutic* client-interface relation, whereby users have the experience of communicating with a human coach "through" the text that is written and read onscreen. Ihde (2010b, 81) has briefly observed that in virtual writing people relate to someone else on the "other side" of the computer screen. For Feenberg (2006), postphenomenological research must delve deeper into issues of virtual embodiment through online text. According to him, e-mail exchanges are occasions when people "wear" language online and create their social beings in mediated relations with others.

Via coaching e-mails DirectLife clients are able to gain much understanding about their personal coach's work practices and personality. For example, one participant contacted the coach because he had forgotten to wear the activity monitor during the assessment week. He believed that his baseline level of activity had been underestimated. The coach answered:

> Thanks for your email. It looks indeed like your plan is a little underestimated since they also used Friday the 10th of July for the calculation of your average activity. If I leave this day out your average activity would be estimated at 815 Cal. Consequently your activity goal after 12 weeks would be 980 Cal. I've already adjusted this in the system.

The participant reconstructs the coach's actions through the reply, as if to ascertain that another human being is "there" to serve him. The coach's dedication and support pleases him, offering the extra motivation to become more physically active:

> She saw the problem. She checked the website. She recognized that there is indeed a problem. So, it is pretty clear that there is a person there that did some work, and then came to me with the result….It's good. Someone is working with you to improve your lifestyle….Yes, that is cool!

The mediated form of personal relations made possible by coaching e-mails does create peculiar types of relationships, for instance, by magnifying conflicts in values, perspectives, and expectations that might be more easily circumvented in immediate personal contact. One participant reported a growing sense of discomfort with her coach, after seeing her identity recurrently distorted by the distance created through the e-mail exchange:

> ….when I said that I didn't have a car, she said, "Yeah, well in the States everybody has a car and goes to work by car." And I thought, "Yes, but are we in the States?!"….And then [in another e-mail] she was talking again about the car, and then I said, "Well, okay, I don't have a car, so please stop talking about cars!"—not that way but nicer, of course—and then she said, "Oh, sorry, bla bla bla…"

She concludes with an in-depth reflection about her posture toward the coach:

> ….she says, "Let me know how these suggestions work and we can go from there." Yeah, but I didn't feel like staying in touch with her, so I didn't….Of course, she probably does this as her work because she likes to help people….I'm not the kind of person to easily take help from others. I rather find it out myself. Now, I also feel a bit that I am offending her, or something. That I am not communicating….I don't know if she is offended, maybe not….Actually, I am ignoring her question right now. Yeah, that feels a bit not so nice, but I also don't feel like I have an obligation to answer.

A communication breakdown like this is possible precisely because empathy is created for the other human being personified by coaching

e-mails. In terms of their impact on clients' social relations, coaching e-mails are the opposite of the automatic e-mails generated on a weekly basis. These convey a human interlocutor only distantly, which is one reason why some participants of the usability study could display a more expendable relation toward them.

> Well, the coach was a person. There was a person there [in the coaching email.] And the automatic were… well, I could just delete them. I didn't care. I knew they were automatic e-mails, so it didn't hurt me, I wasn't angry or… I just read them and then, "Ok, not for me, delete."

Discussion

In view of the limitations of this single study, it would be premature to generalize about any widespread, long-term influence of the DirectLife service on the health condition of its clients. What could be observed are the multiple trajectories arising in different usage contexts: some people readily engage in more active behavior, keeping their personal coaches informed about progress and difficulties; some postpone any initiative to become more active until understanding better their current behavioral patterns; some easily reach or even exceed their improvement targets, maybe because they were already in an physically active period in their lives; and some consider dropping out of the program because it does not appeal to them.

This empirical study allows me to return to the theme of the mediating role of service interfaces. In an earlier part of this chapter, I was critical of the proposal that the interface presents a limited materialistic perspective on how services are experienced by people. The foregoing analysis of DirectLife challenges this view with a much richer outlook. When engaging the interfaces of DirectLife, clients rely on their expertise and motivation to mobilize sociotechnical resources that extend beyond their immediate environment and are partly shared with the service provider. They have established notions about their physical conditions and particular predispositions when reacting to nudges to alter their bodily behavior. In following the program, clients are challenged to experiment with new social identities that are attributed to themselves

and to other actors, including service providers and colleagues at work. It is correct, then, to claim that there is a sociocultural "world" embedding the experience of services. However, from the embodied perspective of clients, this world is only realized as a service dimension in interaction with the material interface.

Clients of a technology-enabled service like DirectLife cannot escape the interface. They may shift attention to other aspects of their environments, but as long as they use the service, they must relate to one of its material interfaces. It is through the interface's materiality that designers can influence how people are constituted as clients in the first place and continuously transfigured in their relations with a service provider. The click of a button activates a vast network for generating readings of physical activity and, in the process, actualizes the body of a DirectLife client as healthy or sedentary. Whether this experience will motivate crowds to adopt more active lifestyles or simply aggravate obesity complexes, that depends in part on how mindfully designers manipulate the service interface considering clients' personal traits and cultural values. Because no service can exist if not through a material interface, therein lies the true challenge for service designers to help catalyze societal transformations.

Chapter 4
Visualizations in Service Design Practice: The Case of Philips DirectLife

Chapter four continues with the analysis of DirectLife, but instead of addressing the client perspective, as done in the previous chapter, it turns to the designer perspective and his or her experience of the interface during new service development.

While still in its infancy, the discipline of service design already counts on a number of empirical studies into the working practices of service designers.[36] One of the findings reiterated by these studies is the pervasive role *materiality* plays in service design work. Indeed, every time service designers are portrayed, through text, videos or photographs, they are found laboring amidst the "materials of their trade," including sketches, sticky notes, physical mock-ups, slide presentations, and so forth. These materials have a multiplicity of uses in the design process: from notes placed on the wall to summarize topics of an ongoing discussion, to hand-drawn sketches meant to sensitize providers about the needs and wishes of clients, and more.

Although not always emphasized in these empirical studies, there are certain materials that become special for designers because they visualize the service interface that is the main object of their practices. A good example is the toolkit devised by Clatworthy (2011), which comprises several physical cards representing the common "touchpoints" used by service providers to contact their clients: contracts, websites, telephone calls, logotypes, invoices, and so forth. Clatworthy argues that design teams can make use of these cards for several purposes during the front end of innovation processes, for instance, to understand people's impressions of an existing situation, to coordinate activities within the provider organization, and to locate key areas for improvement.

---

36. E.g., Blomkvist (2011); Kimbell (2011); Segelström (2010); Stigliani and Fayard (2010); Zomerdijk and Voss (2010).

Underlying these applications is the visual reference these cards make to material interfaces that service providers could actually manipulate when trying to create an intended experience for clients.

The current emphasis on the role of visual materials in service design is often accompanied by more fundamental claims about the object and scope of this emerging practice. A widespread view inherited from marketing and propagated by Clatworthy (2011, 25), among others, is that services are essentially "immaterial experiences" and that designers rely on materiality to "tangibilize" the service and to "orchestrate" the experiences of clients. Based on similar assumptions, Stigliani and Fayard (2010, 15) conclude that "the use of visualization techniques and prototypes….[is] even more important in service design than in other design disciplines which are supposed to deliver tangible outcomes."

Making some headway against the discourse on intangibility, Kimbell (2011, 42) regards as the purpose of service design "proposing and creating new kinds of value relation within a socio-material configuration involving diverse actors including people, technologies and artifacts." From such a perspective, the materials used by service designers function as "enablers" for the cocreation of value by the actors who get involved in service exchange (Kimbell 2011, 48–49).

Despite these advances in acknowledging the importance of materiality in service design, the extant studies provide little detail on how designers actually experience the service interface through different types of visual materials. Blomkvist and Holmlid (2011, 35), for instance, briefly state that a service prototype (visual or not) may be low- or high-*fidelity* depending on how closely it "resembles a finished product." And Diana et al. hold that visualizations used in service design can vary in terms of *iconicity*, or the "coherence between the representation of an object and the real appearance of the object itself" (2009, 2), and *time*, by conveying either an "instantaneous picture of the service" or the "sequence of actions and stages that compose the service experience" (2009, 3). However, these suggestions have not been supported with detailed empirical analyses of commercial design projects. In addition, all of the present investigations concentrate on the early stages of the service design process and contemplate mostly the perspectives of consultants

self-identified as service designers.

The study of DirectLife presented in this chapter is intended as a contribution to our understanding about the role of visual materials in service design. In order to extend the scope of the studies discussed above, I cover a whole design project running from the early conceptualization stages to the final implementation of a new interface feature of the DirectLife website. In addition, I take into account the opinions of professionals from various backgrounds who integrate the DirectLife service design team.

The next section contains a review of a line of postphenomenological studies that look into technologies of scientific imaging and the role of materiality in the design process. In the subsequent empirical analysis of DirectLife, I will demonstrate that the postphenomenological concepts discussed next are useful for explaining how visualizations of a new service interface are experienced and interpreted from a design perspective.

Postphenomenology, Imaging Technologies, and Design

As shown in chapter three of this thesis, postphenomenology offers many resources for explaining how clients experience services in everyday life. Besides the attention to daily usage contexts, however, another broad domain of postphenomenological studies investigates the use of technologies in scientific practice.[37]

Ihde (2009a) holds that all sciences, at least since their late-modern manifestations, are essentially technology-embedded; hence, his preference for the term *techno*science. Departing from his phenomenological heritage, and working at the intersection between the philosophy of science and the philosophy of technology, in the book *Instrumental Realism* (1991) Ihde posits that technoscientific practice is necessarily *perceptualist*, in that it relies on observations made by embodied human beings, but also *materialist*, because of its dependence on mediating instrumentation to arrive at such observations.

Ihde's position is elaborated further in *Expanding Hermeneutics* (1998), a book that incorporates a detailed study of the role of imaging

37. E.g., Hasse (2008); Ihde (1979); Ihde (1991); Ihde (1998); Ihde (2009a); Rosenberger (2008); Rosenberger (2011); Rosenberger (2012).

technologies in astronomy. Although astronomical practice has been technologically mediated since ancient times, Ihde holds that it underwent a profound transformation around mid-twentieth century, when new instruments made it possible for researchers to detect radiation beyond the limits of visible light and to thus visualize a whole new range of celestial objects that sit beyond immediate bodily experience. Ihde later referred to this period as the "second scientific revolution" (2009a, 45–62).

In order to frame this trajectory of technological development and differentiate between the two moments in the history of astronomy, Ihde relies on a distinction he introduces between *isomorphic* and *translational* technologies. An isomorphic technology, which Ihde associates with the moment preceding the "second scientific revolution," is any kind of technology-generated visualization, or image of a phenomenon that resembles unmediated experience of what that visualization depicts (1998, 165). For example, a photograph of the Moon may be called isomorphic because it resembles how this object appears in the context of "eyeball" observations dispensing with the photographic equipment. Although isomorphic visualizations tend to become experientially "transparent," in the sense of interfering minimally as an artifact in the observation, Ihde holds that they nonetheless transform the phenomena experienced, for instance, by magnifying the Moon's "spots" into craters or "freezing" the sense of elapsed time of unmediated experience into the static display of a photograph.

A translational technology, which Ihde associates with the "second scientific revolution," is a technology-generated visualization that affords experience of a phenomenon in ways that are not isomorphic to the referent object (1998, 167). An example would be the false coloring applied to the otherwise invisible gamma rays emitted by a distant quasar. But by translational Ihde also means any visual material taking the form of charts, graphs, models, etc., which are "text-like" because they require some interpretation process akin to reading practices.

Although isomorphic and translational visualizations at times appear to be ambiguously interrelated (Ihde 1998, 58–59, 167–168), and although isomorphic visualizations may be as much constituted by scientists in interaction with technological instruments as translational

ones (Ihde 1998, 178–180), Ihde maintains that the latter conveys a stronger sense of construction of the scientific object by the technology, what he terms "technoconstruction"(1998, 181–183). The process of technoconstruction often involves the use of computer modeling and sophisticated apparatuses that open up possibilities for more complex manipulation of the objects under scientific study. One of the characteristic traits of technoscience's contemporary visualism, according to Ihde (1998, 183), is the generation of "composite" depictions based on many technology-generated visualizations, or "variants," upon scientific phenomena.

The above reference to "variants" points back to Ihde's notion of *multistability*, introduced in the book *Experimental Phenomenology* (1986a). Multistability, in the context of Ihde's analysis of technoscientific practice, implies that a "same" object under study may be portrayed and interpreted through different visualizations. However, it is also possible to approach the notion of multistability as referring to the different interpretations held over a single visualization of a scientific object. Rosenberger (2008; 2011; 2012), for example, has discussed multistability in cases of controversies regarding scientific images, and Hasse (2008) has shown that physicists may interpret the "same" scientific image differently depending on previous training and cultural background. Although all of these cases are limited to isomorphic visualizations, as Rosenberger (2008, 65 n4) observes, translational ones may also be multistable.

But how to approximate these discussions on the visualization practice of technoscience to service design? To be sure, Ihde himself rarely touches the topic of design. Recently, in a brief flirtation with the areas of engineering and architecture, he discusses CAD software as a form of isomorphic technology, suggesting that design and technoscience are not entirely dissimilar practices, at least when it comes to their reliance on visual materials (Ihde 2009b). The other occasion where Ihde articulates a position about design is in admonition to what he calls the "designer fallacy" (2008, 29–30). This fallacy arises from the erroneous belief that technologies are sheer "plastic" and "passive" materials that may be fully predetermined in the design stage. In contraposition, Ihde notes that

technologies often come into existence as their designers unexpectedly stumble upon the discovery of hidden potentialities in the materials they are working with. Ihde holds that the final form of technologies is the result of the many "accommodations" between designers and materials that happen during the development process.[38]

In order to successfully appropriate the insights discussed above for the empirical analysis presented in this chapter, it is necessary to establish how the practice of service design may approached from a postphenomenological perspective. My proposal is to investigate the visualizations of a new DirectLife interface from the perspective of the professionals involved in devising and implementing it. In what follows, I will describe how several visual materials generated and used by the DirectLife design team conveyed knowledge about an improvement made to the website interface for clients. Also, building on the postphenomenological insight about the lack of complete control over materiality during design, I will show that these visualizations partly determined what was to be achieved as an outcome of the development process.[39]

Designing the DirectLife Interface: A Postphenomenological Study

Researching Design Practices at the Philips Incubator

At the time data for this study was gathered, from April to July of 2009,

---

38. Although I highlight here the unpredictability of technologies during design, Ihde's argumentation is also geared toward explaining that the final uses of technologies cannot be fully anticipated and predefined by designers. The same assumption underscores much of Verbeek's writings on design (e.g., 2005, 203–236; 2011, 90–138). According to Verbeek, designers can embody certain "scripts" in technologies, and try to influence how users will behave; in turn, the materiality of these technologies may also embody its own scripts, motivating new uses that had not been specified by designers (Verbeek 2011, 90–119). Differently from Ihde, however, Verbeek argues that because technologies inevitably shape the moral actions of users, and because the outcome of this scripting process is essentially difficult to predict, that only intensifies the need of scrutinizing the practices of designers.

39. In adopting a postphenomenological stance on the visual materials used by the DirectLife design team, I do not mean to imply that this service was only designed through these visualizations, nor that designers themselves adopted a postphenomenological perspective to guide their work. My position is that visualizations of the DirectLife service interface played an important role in the development process and that postphenomenology presents a suitable framework for explaining how designers relate to these materials.

the DirectLife service was under the direct responsibility of New Wellness Solutions (NWS). NWS was a new venture within the Philips Incubator, an initiative of the multinational to support the commercialization of promising proprietary technologies. The DirectLife program had been under development for a couple of years with some external collaboration, including that of interaction designers from Philips Design and behavioral psychologists from Philips Research. It was being tested in some controlled trials, mainly conducted at partner organizations, such as Philips Research itself.

The then-recent appointment of a new CEO for NWS was tied to the understanding, from the part of global electronics manufacturer, that the DirectLife service was sufficiently mature to be launched in the marketplace and tested for its profit-generating potential. Assessing the commercial viability of DirectLife was especially important for Philips, because this service embodied a new strategic, company-wise aspiration to become a leading brand in the areas of healthcare and well-being (Philips 2008). The upcoming global launch of DirectLife, both in The Netherlands and the United States, was grounded on a business model primarily aimed at the business-to-business market, where DirectLife was marketed to organizations wanting to alleviate costs associated with the sedentary lifestyles of their employees. Besides this market positioning, preparations were underway for selling DirectLife directly to end-users through the Philips website.

I was invited by a member of NWS's management board to conduct this research at their headquarters, in Eindhoven. During the period of data collection, I regularly visited the NWS office, where I was collocated with the software development team. Early interactions with the NWS staff provided a general overview of the several innovation projects running concurrently at the time this research was carried out. Based on this overview, a decision was made to focus on the design of the new *goal adjustment interface* of the DirectLife website. This specific design project resonated well with my research objectives and had a manageable degree of complexity in view of the planned research investments.

Figure 4.1 displays the main webpage implemented as the outcome of the goal adjustment design project. On this screen, clients can check

their actual achievements at certain weeks in the activity improvement program and adjust their final targets accordingly.

The goal adjustment interface was a key initiative to improve the DirectLife service, reverberating at different levels within NWS. On the strategic side, it was planned as one of the achievements of the *Runner* milestone. Milestones, in NWS, ran for several months and set higher-order strategic objectives that helped to structure, from the top down and with the participation of the management team, broad areas for improvement of the DirectLife service. Before Runner, there had been the *Walker* milestone, and as Runner unfolded, preparations were underway for the *Biker* milestone.

Within Runner, the goal adjustment interface was included in one of the two major innovation "themes" under responsibility of NWS's marketing managers. *Information for Runner* was the theme dedicated to finding out better ways of informing end-users about DirectLife, particularly during the initial stages of the program. *Personal Goal Commitment*, of which the goal adjustment interface was the principal element, answered to the perceived need of increasing DirectLife clients' commitment to reach their improvement targets and their motivation to successfully conclude the program. As such, the addition of this interface clearly connected to DirectLife's purpose of helping people to attain long-lasting gains to their physical health.

Finally, at the operational level, the design of the goal adjustment interface was immediately under the control of the software development team. They applied the Agile Scrum Methodology, which is a methodology for software development that encompasses the specification, deployment, and test of software applications in quick, iterative steps.

Starting with the software developers, sixteen semi-structured interviews were conducted with the DirectLife design team, including marketing managers, graphic designers, coaches, members of the scientific affairs board, and other external collaborators. These interviews followed a semi-structured topic guide covering issues such as their professional background, roles within NWS, and most importantly, personal involvement with the design of the goal adjustment interface. The interviews usually lasted for forty-five to sixty minutes, and progressed

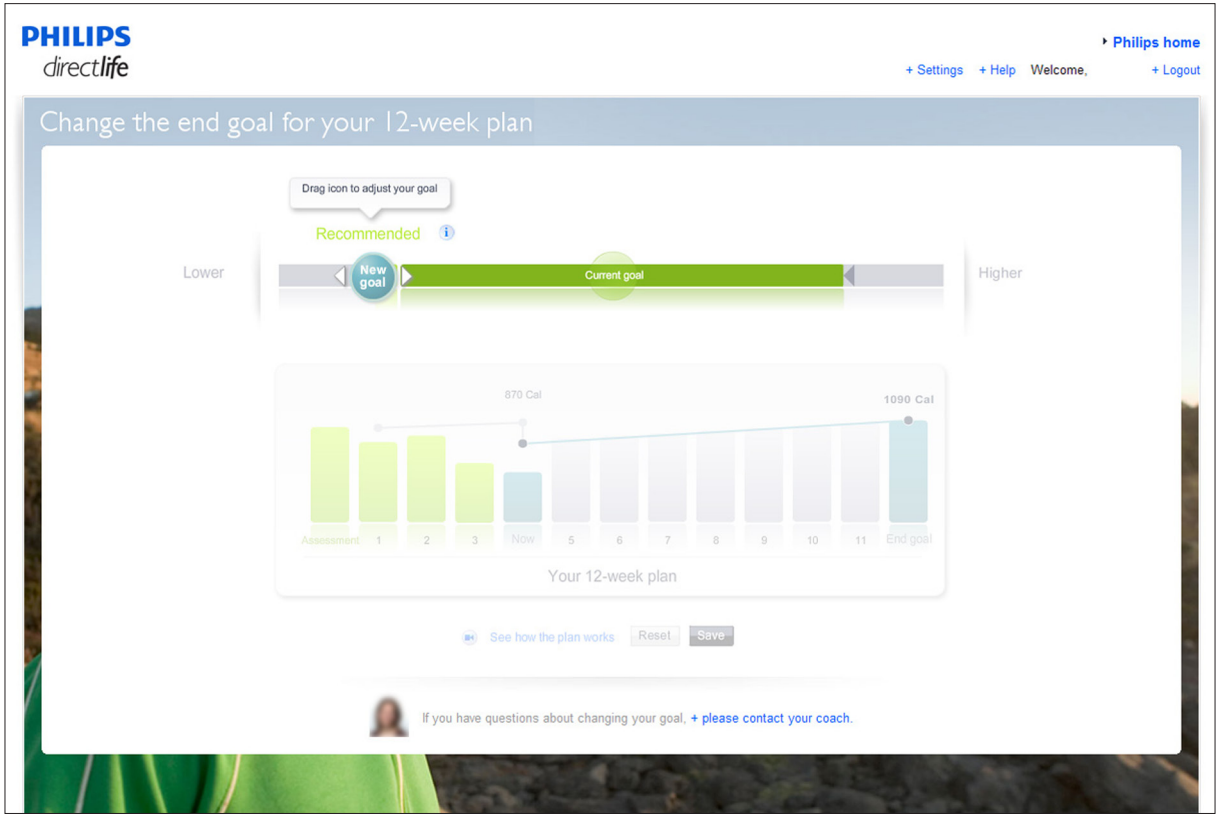


Figure 4.1. *Screenshot of the goal adjustment interface implemented in the website.*

from general to more specific questions about the topics discussed. In order to clarify their arguments, interviewees often relied on hand-made sketches, printouts of other digital materials, or content shown on their computers. All interviews were entirely recorded in sound. When visual materials were discussed, the interviews were videotaped as well. Additionally, the interviewer jotted down notes during the interviews, which could be later expanded. A student assistant transcribed all interviews in verbatim format.

In addition to the interviews, partial access was provided by NWS to the web-based platform used for managing the software development process and for team communication. This database contained a vast array of digital resources, including strategic plans, minutes of group meeting, slide presentations, software release notes, among others. Preliminary analyses of the documents helped to inform topics to be covered in the interviews. Conversely, the interviews often hinted at new content that could be found in the digital database of NWS. In this process, the data collection process tended toward increasing focus and comprehensiveness. Reaching the point of apparent saturation of information, the research effort was redirected to the organization of data for computer-assisted analysis using the Atlas-ti software. Data analysis and writing then followed, in general lines, the procedures detailed in chapter three, with the exception that they were also informed by the concepts and theories discussed in this chapter.

Wireframe and Flowchart: Isomorphic and Translational Visualizations

The earliest visualizations of the goal adjustment interface did not circulate among the whole design team and were not digitalized in the platform used by them. The first recorded and widely used visualization of this interface is the wireframe illustrated in Figure 4.2. An interpretation of the wireframe from a design perspective reads as follows:

- In specific weeks in the DirectLife program, clients have the opportunity to adjust the goals to be reached at the end of 12 weeks;
- The text on the top explains what is to be accomplished in this webpage;

- The green button at the center represents activity targets for the end of the program, which is set at a healthy level;
- The gray button on the left represents the level of physical activity at the time the program was initiated;
- The dotted circle between these two buttons displays achievements for the current week;
- To adjust the final activity target, clients have to move the green button along the horizontal slider in either direction;
- By sliding it to the right, the level of calories to be burned is increased, making the end target more difficult to reach;
- By sliding it to the left, the end target becomes more easily reachable;
- The exact amount of calories for each chosen position is displayed just below the green button;

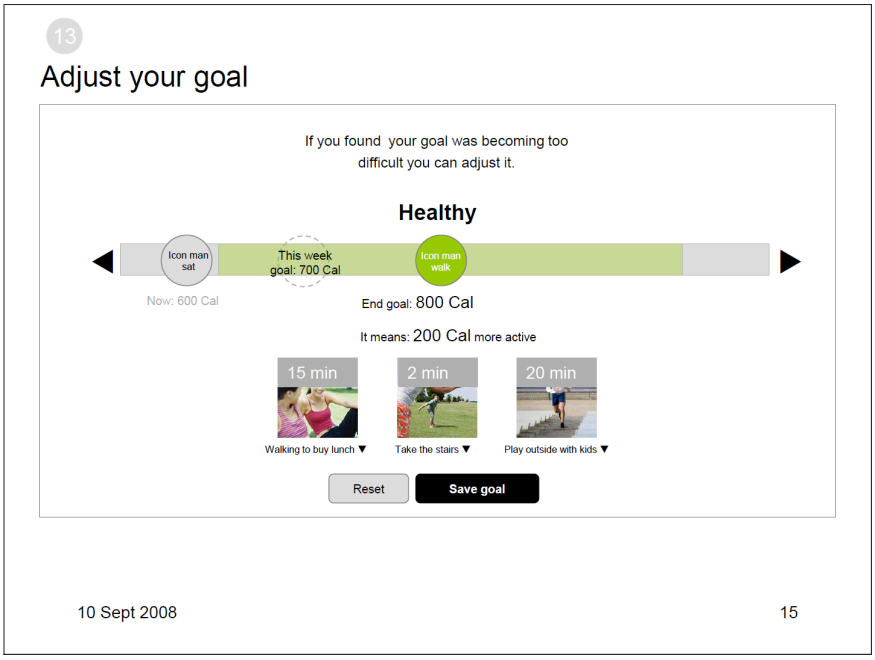


Figure 4.2. *Wireframe visualization of the goal adjustment interface.*

- In addition, in the lower part of the webpage, the three square pictures indicate examples of physical activities that can be done in order to reach the desired target;
- Because this association makes the end goal more actionable for clients, they are expected to become more committed to increasing their physical activities;
- Finally, there are options to either save the new activity target or reset the webpage to its starting condition.

Another visualization generated early on in the design process to depict the goal adjustment interface is the flowchart of Figure 4.3. Starting from the top, it may be read as follows:

- As clients log on to the website on weeks 4, 7 and 10, a pop-up appears asking them if they want to review the end goal in the program;
- If the choice is to be reminded later (right option), clients are redirected to the dashboard homepage;
- If the choice is to keep the current activity target (left option), the history view webpage will be shown next;
- If clients decide to adjust their targets (middle option), the goal adjustment webpage with the slider will appear;
- And so forth, concluding in the bottom of the page with their usual usage of the DirectLife website.

It is now possible to analyze these two visualizations according to the postphenomenological distinctions introduced before between isomorphism and translation. However, it would be highly problematic to compare these visualizations to the interface that was eventually implemented as part of the DirectLife website (see Figure 4.1). If such a comparison were to be attempted, the wireframe of Figure 4.2 would possibly be deemed isomorphic because of its marked resemblance with several visual elements of the implemented interface (the horizontal slider, for instance). But this analysis is misguided, if not for anything else, because the interface displayed in Figure 4.1 had not yet come into existence when the wireframe and flowchart were first created! The

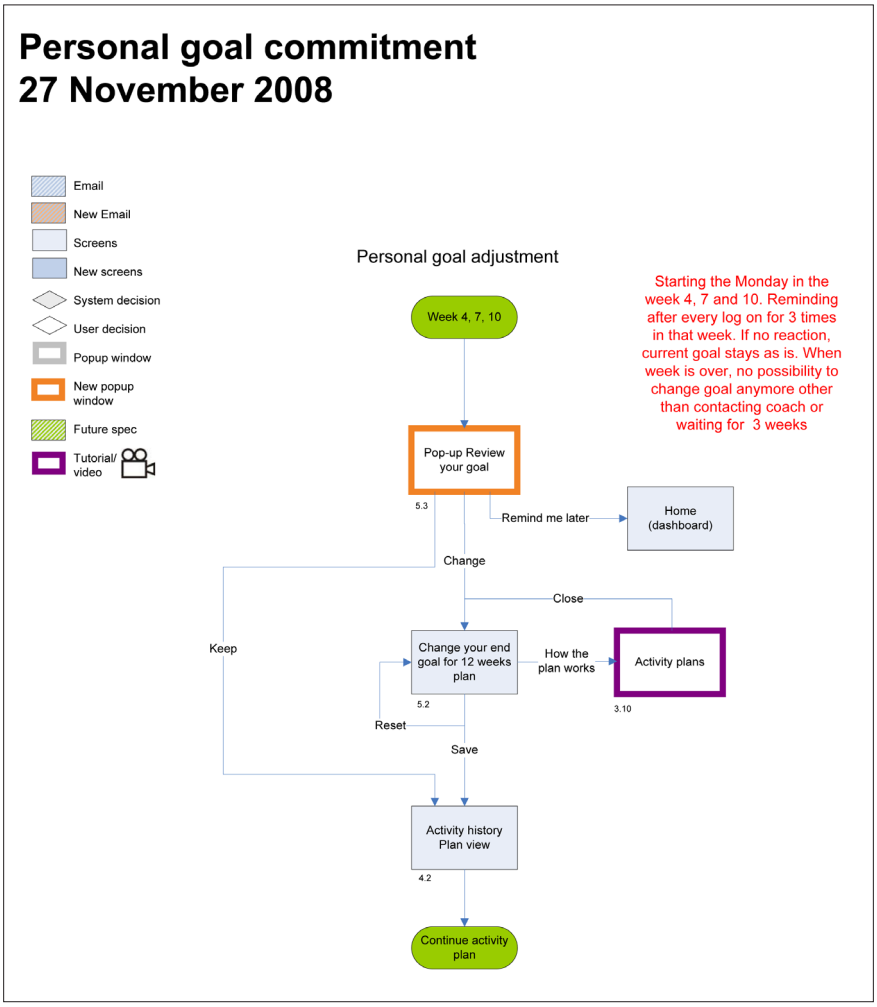


Figure 4.3. *Flowchart visualization of the goal adjustment interface.*

referentiality of the visualizations in Figures 4.2 and 4.3 to an object that did not yet "exist" materially (at least not independently from the visualizations themselves) poses a significant challenge for adopting a postphenomenological standpoint in the context of design practice. If images like the wireframe cannot be explained with reference to any pre-existing goal adjustment interface, how to claim their isomorphism? Also, if the flowchart similarly depicts an inexistent object, how to tell

that it is an image that moves away from the isomorphic?[40]

The plausible alternative, in my opinion, is that the experience of the wireframe and the flowchart does not rest on any reference to the *real* interface itself, but on associations with whatever aspects of the world designers make in the act of interpreting these visualizations. For example, solely in comparison to other existing screens of the DirectLife website, designers may already discern that the color palette used in the wireframe, as well as the contours of its graphical elements, give at best rough approximations of the intended look of the new interface for clients; hence it being called a "wireframe" in the first place. Similarly, designers who know how clients normally interact with computers may discern that the green button sitting on top of the slider, although static in the wireframe, refers to an interface element to be moved by clients from left to right. Following this interpretation, the isomorphism of the wireframe holds true, not because of any direct reference to a goal adjustment

40. These questions might apply, too, to the types of technoscientific visualizations that postphenomenological researchers have analyzed. If an instrument can detect gamma ray emissions from a distant quasar and translate these into visible format, how to understand the non-isomorphism of this visualization, if the object of interest is in theory outside the limits of human perception? On the same token, on what basis may photographs of Neptune be called isomorphic, when ordinary human capacities do not permit Earth-bound sights of this planet in the night sky? The idea that isomorphic visualizations of an object carry a semblance to technologically unmediated perception of that *same* object seems untenable. It would be possible to add this critique to earlier charges of foundationalism that some have made against the postphenomenological standpoint (e.g., Scharff 2006). Indeed, while Ihde carefully avoids mention of some form of "founding stratum" of human experiencing, for instance, by holding that perception is always culturally-historically informed (1998, 157, 162), or by relating isomorphic visualizations to the notion of "naïve realism"(1998, 178) and the experience of the "things themselves"(1998, 167), while modulating these terms with scare quotes, postphenomenological researchers would still need to explain how the difference between isomorphic and translational technologies is justifiable, if not with reference to a presumed direct encounter with the *things themselves*. At the same time, I acknowledge that the problem noted here is much more pronounced in service design contexts than it is in technoscientific ones. As Ihde (2002, pxvii) once observed, scientists can be peculiar in comparison to other practitioners in clinging to the view that their manufactured visualizations portray objects as they exist independently "out there." This does not seem to be the case with designers, however, for whom visualizations are devised with the intent of materializing an object that evidently does not yet exist. I am indebted to Robert Rosenberger for raising my attention to the difficulties of questioning ideas proposed in the context of technoscience on basis of empirical observations made in another context.

interface that has yet to come about, but for resembling, among other things, existing webpages and the interaction with computers.

A similar interpretation process explains the experience of the flowchart from a design perspective. The flowchart of Figure 4.3 is a translational visualization, in the extent that it depicts in non-isomorphic ways how websites are commonly experienced by clients. However, as the flowchart was devised later in the design process, the interpretation of this visualization can also rely on a web of relationships including the wireframe and other existing visualizations. Thus, the gray box titled "change your end goal for 12 weeks plan" depicts, in non-isomorphic ways, the entire webpage that is shown in Figure 4.2. This dependence of the flowchart on the wireframe does not imply that its meaning is reducible to the interpretation of the latter. Through the boxes contained in the flowchart, for example, designers gain a complementary understanding of a client's sense of location at a specific step of the goal adjustment process, which the wireframe by itself does not convey. The wireframe and the flowchart, therefore, are multistable visualizations that afford different readings of the goal adjustment interface and transform the designer experience of it in peculiar ways.

Lest the distinction between isomorphic and translational crystallize into strict "classes" of visual materials, it must be noted that both modes of referencing can be found in each specific visualization, to a greater or lesser extent and ambiguously related. For example, even though the individual boxes in the flowchart translate, for designers, how clients will experience the webpages separately, seeing the boxes consecutively conveys isomorphically the sense of elapsed time when moving from one webpage to the other.

What emerges already at this initial analysis is the social context embedding the interpretation of visualizations of the goal adjustment interface. From a design perspective, the goal adjustment interface emerging as a composite object formed by the multiple perspectives offered by the wireframe and the flowchart is not really "out there;" it is intersubjectively constituted in relation to DirectLife clients. In other words, these intermediary visualizations materialize the goal adjustment interface for designers, *as* it is intended for clients. In the cases discussed

so far, clients were only virtually made present through the visual materials. But the design of the goal adjustment interface also evolved in more direct consultation with them, as seen next.

Demos: Testing Alternatives with Clients

At a certain stage of the design process, doubts were raised whether clients would understand what DirectLife wished to communicate and be able to use the new goal adjustment interface appropriately. Some thought that the new feature under development was "not sense and simplicity yet" (a hint at Philips' brand positioning). Therefore, a small-scale usability test was organized with participants from the pilot organizations where DirectLife was currently being tested. This study was conducted by a webdesigner from NWS who was asking for greater integration of client feedback during the design process. Three interactive demonstration mock-ups, or "demos," were created in Flash by a member of the software development team (see Figures 4.4, 4.5, and 4.6). These visualizations convey a greater degree of isomorphism than the wireframe, and testers could actually interact with them on the computer.

In the first demo (Figure 4.4), DirectLife clients slid the walking-man icon at the center, in order to set their end goals for the 12-week plan to the left or right. The other translucent walking-man icon accompanied this movement, showing how activity targets for the current week would vary according to the target set. The blue sitting-man icon remained static, displaying the activity level that was measured at the start of the program.

Following this manipulation at the top of the webpage, at the bottom half the percentage scores and the dotted scale would alter as follows: when the end goal was made higher (moving to the right), the percentage and the scale decreased in value; as the end goal was made lower (moving to the left), the percentage and the scale increased. According to the designers of the demo, this inverse relationship was because the green circle should display how clients' current achievements compared to their intended new targets. However, the usability study revealed that the relationship between the upper and lower parts of this demo was unclear to many users.

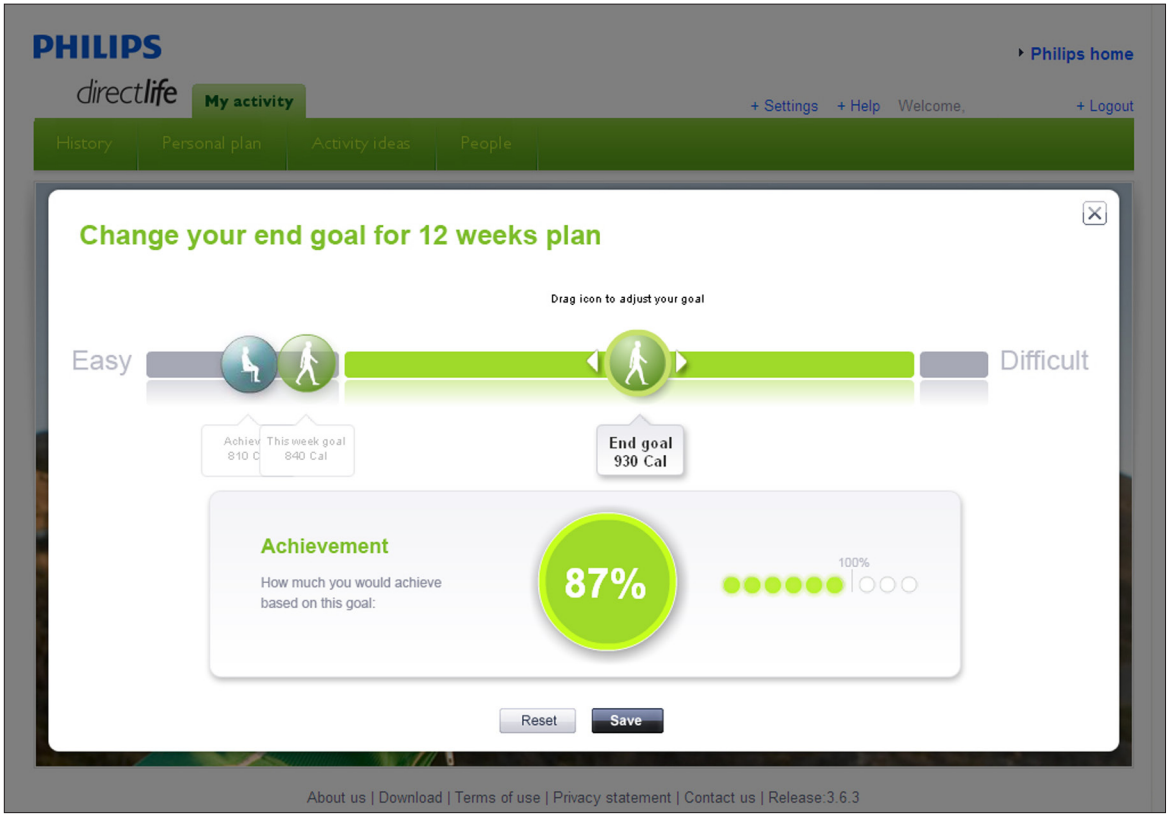


Figure 4.4. *First demo of the goal adjustment interface.*

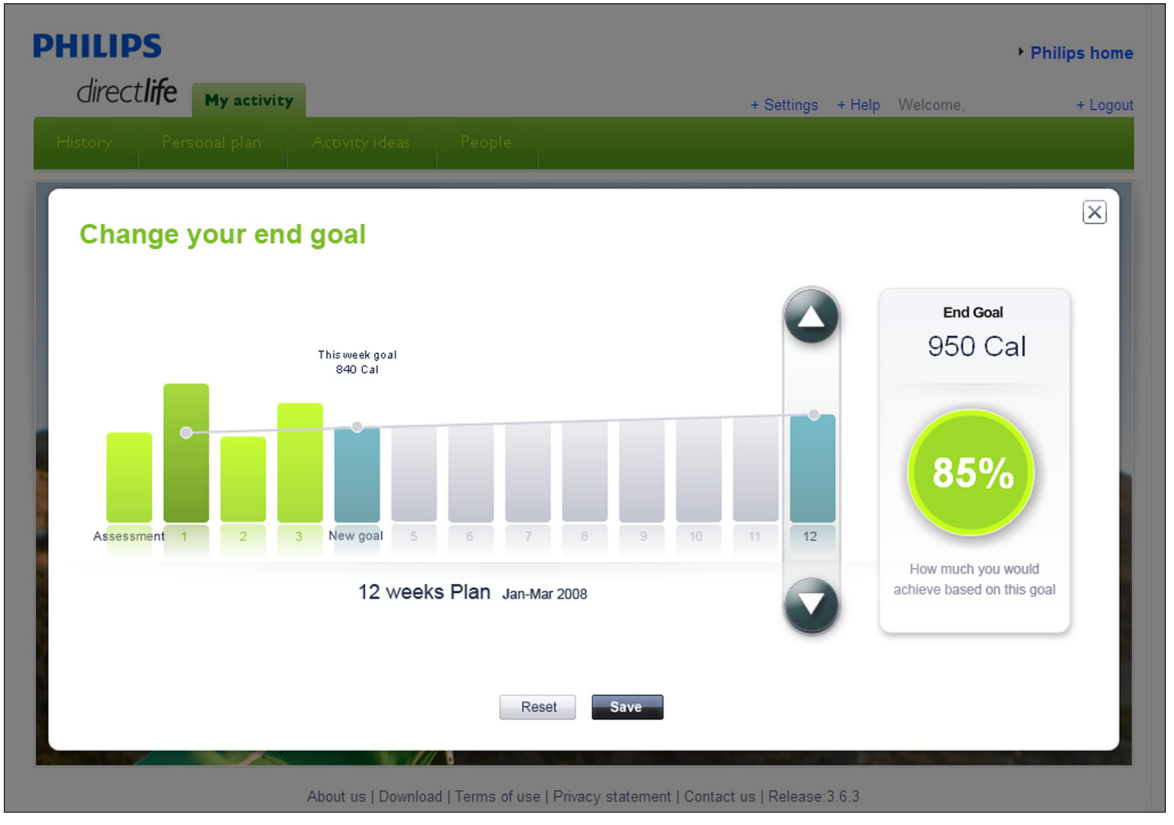


Figure 4.5. *Second demo of the goal adjustment interface.*

In the second demo (Figure 4.5), clients set their end goals by clicking on the "up" and "down" arrows at the right side of the graph. They were already familiar with this way of representing activity levels, because another existing page of the DirectLife website (the history view) contained a similar graph. When clicking on the top arrow above the twelfth bar, this bar got taller and raised through a sloping line the other bars to the left. The opposite happened when clicking on the down arrow.

Although the horizontal slider contained in the first demo was now absent, a comparable relationship between the starting, current, and end activity targets was conveyed through the raising and lowering of bars. The green circle on the far right worked along the same principle as in demo one, and was equally unintelligible to many participants of the usability study.

In the third demo (Figure 4.6), users moved the "goal" toggle along the slider in a similar way as in the first demo. Differently from that demo, the slider was colored with a gradient running from green to red. The subtle addition of a "recommended range" on top of the slider was praised by participants for suggesting how much "easier" or "too difficult" end goals should be set, in DirectLife's opinion. Apart from these differences, this demo had almost no numbers, with the exception of the percentage below the goal button, which once again expressed the extent to which current activity levels compared to the intended new target.

Before the usability test, the three alternatives could be seen as multistable visualizations of the goal adjustment interface. From the perspective of the design team, each alternative was internally coherent, realizable, and potentially valid for DirectLife clients. Based on the interpretations of clients and the learning gained through the test, the design team became more confident of what future reality would be more desirable and why. As an interaction designer from Philips Design summarized:

> ...so we had from very simple to more complex [concepts],
> a range of things. When it was too simple people felt that it
> was not in their value, because they felt it was a bit too simplistic.
> So, we had to have something that gave them enough trust that
> it was still scientific. We had to find a balance in-between...

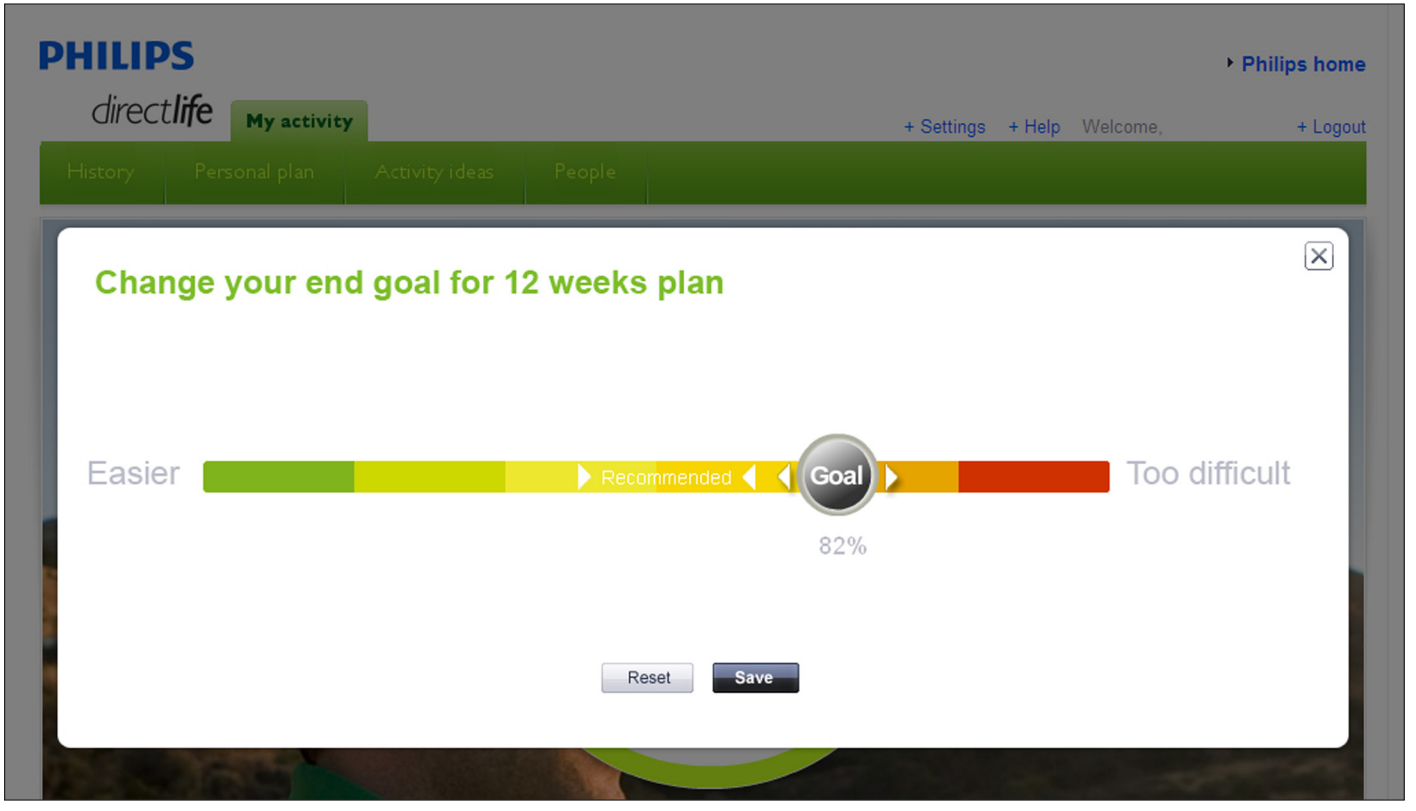


Figure 4.6. *Third demo of the goal adjustment interface.*

Eventually, the balance found was to integrate positive aspects from each of the separate demos into an improved design. From this point on in the development process, novel visualizations of the goal adjustment interface would contain a slider on top, as in demo one, a graph at the bottom of the screen, as in demo two, and a recommended area, as in demo three (see Figure 4.1, for example).

The goal adjustment interface, however, did not become a simple combination of portions of the preceding demos. As explained by one of the software developers, to facilitate comprehension it was decided that the graph's bottom part would be faded out when the webpage loaded, so that clients focused first on the slider (see Figure 4.1). Then, as they started to operate the slider, the graph would become fully colored and animated by their actions. Thus, the new visualizations created after the usability tests transformed preexisting conceptions of the goal adjustment interface in ways that were not supported by the demos anymore. These once useful visualizations turned into obsolete depictions of a reality that would never actualize for clients.

Dynamic Texts: Organizing Work within the Design Team

Following the usability test, subsequent work on detailing the goal adjustment interface was conducted by interaction designers from Philips Design. They were supposed to deliver the final visual designs for all the webpages of the goal adjustment interface in static Photoshop images. The software development team at NWS, then, would implement these images into the software codes that generate the DirectLife website interface for clients.

One area where the conversion of the static Photoshop images into dynamic webpages was prone to complications concerned text. Depending on individual circumstances, such as a client's achievements in the program, the goal adjustment interface had to load with different textual content. In addition, clients could choose different languages for the website, which meant that before going online, all text had to be checked for their English by a professional copywriter and later translated into Dutch and Spanish.

To help manage the text editing process, designers from Philips Design were asked two special deliverables. One was a visualization that was identical to the final visual designs of the different webpages but with all text fields carefully numbered (Figure 4.7). The other was an Excel file displaying the dynamic textual content following the numbering system introduced (Figure 4.8).

Figure 4.7 illustrates the numbered visualization of the pop-up leading clients to the main goal adjustment webpage. This is mostly an isomorphic visualization of the pop-up's final visual design, except for the numbers in blue, which do not refer to anything clients are expected to experience in the DirectLife website. Instead, these numbers refer to the rows found in the left-side of the Excel spreadsheet containing the dynamic textual content for this pop-up interface (see Figure 4.8).

In the Excel spreadsheet, the first light blue column in the left indicates whether that text field is "dynamic" or "static." The adjacent light blue column to the right defines the rules that apply to either condition. For the design team, these two columns connect to calculations done by the website software to determine whether individual clients are below, on, or above targets in any specific week in the program. Depending on a client's situation, he or she will be shown the appropriate textual fragment contained in the dark blue column to the far right (edited text). The black column named "original text" displays preliminary text before it is sent for copywriting.

Looking at the rows 5.3.7, the suggestion of the copywriter has been to change all the preliminary versions of dynamic texts into "I want to change my goal." This altered fragment is an isomorphic visualization of the textual content that software developers need to implement in terms of the website's codes. Thus, through the Excel spreadsheet, the copywriter was able to contribute to the design of the goal adjustment interface with her own expertise. Besides simply correcting spelling and grammatical mistakes, she mentioned having been especially preoccupied with the general "tone" of communication of DirectLife:

> …the way things are said, I think is really important, especially in longer text. Even in these as well. Each interaction, each screen, each interaction with the user, you know, you don't want to leave

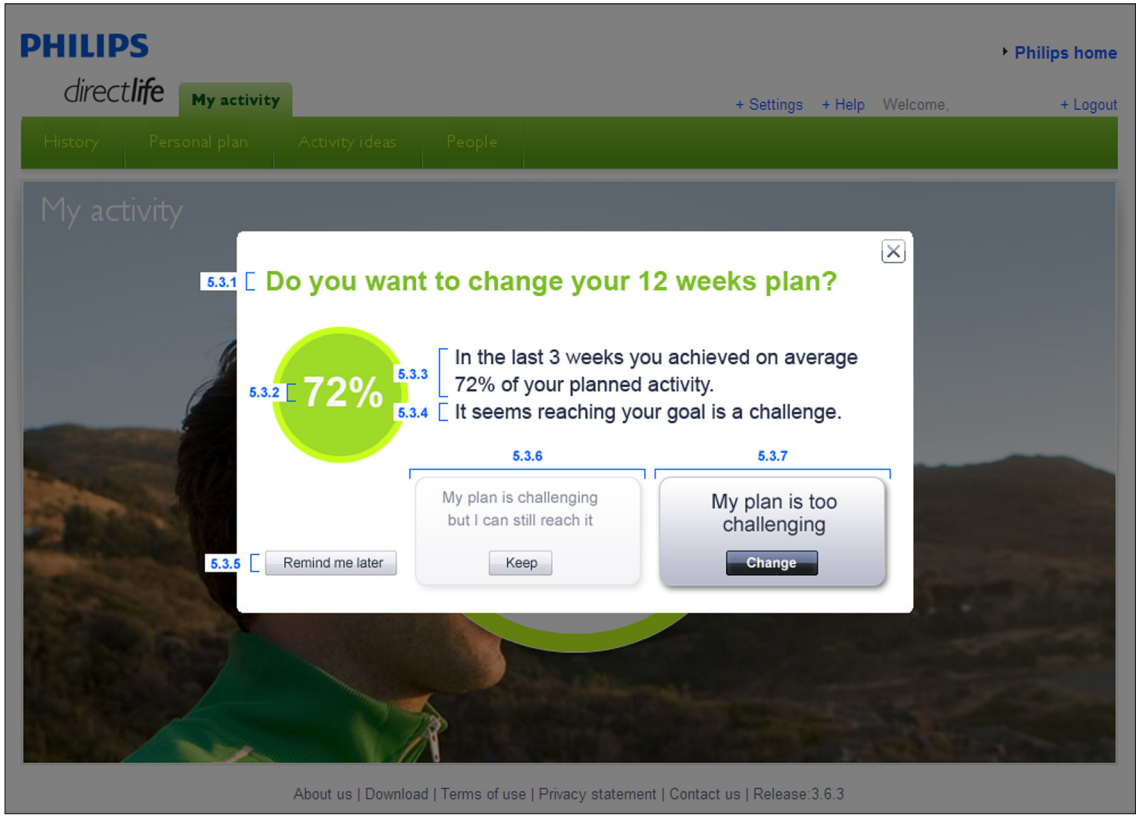


Figure 4.7 *Numbered visualization of the goal adjustment interface's pop-up.*

	A	B	C	D	E
1	**5.3 Pop up review Goal**				
2					
3					
4			RULES	original text	edited TEXT
5	5.3.1	static		Do you want to change your 12 weeks plan	Would you like to adjust the end goal for your 12-week plan?
6					
7	5.3.2	dynamic		XX%	XX%
8					
9	5.3.3	dynamic		In the last 3 weeks you achieved on average xx% of your planned activity.	Over the last three weeks, you averaged xx% of your planned activity target.
10					
11	5.3.4	dynamic	x< 95%	It seems reaching your goal is a challenge.	Is reaching your goal too much of a challenge?
12			95%<x<105%	It seems that you are reaching your target	It's clear that you're on track for success.
13			x>105%	It seems reaching your goal is too easy.	You're doing well. Make sure your goal is not too low.
14					
15	5.3.6	dynamic	x< 95%	My plan is challenging but I can still reach it	My goal is challenging but I can still reach it
16			95%<x<105%	My plan is challenging enough	My goal is good as it is
17			x>105%	My plan is challenging enough	My goal is good as it is
18		static	Button	Keep	Keep
19					
20	5.3.7	dynamic	x< 95%	My plan is too challenging	I want to change my goal
21			95%<x<105%	I want to change my plan	I want to change my goal
22			x>105%	My plan is too easy	I want to change my goal
23		static	Button	Change	Change
24					
25	5.3.5	static		Remind me later	Remind me later
26					
27					

3.3 Compare with others | 3.4. Your plan | 3.7 & 3.8 Profiles | 3.9 Readiness screen | 5.2 Adjust goal | **5.3 Popup review Goal** | 6.1 Personal Plan

Figure 4.8. *Dynamic texts of the goal adjustment interface's pop-up.*

> them with a bad feeling or leave them wondering "Uhm… but that is strange! That word is strange!" or "Well, it's not too hard for me, I was just really busy!" You know? You don't want to set them off, and sometimes people can be sensitive. So you have to do things in a certain way.

In the specific case of the changes mentioned above, the copywriter's feeling was that the original text was too blunt and confronting for clients:

> I think when people are on a fitness program and to admit that a goal is too challenging, that is really demotivating. So, it is more like "Oh, well, I didn't have time" or, you know, "This month was really busy." But it all boils down to, that they want to change their goal, whether it is too challenging or too easy. And I didn't feel that [the original text] was relevant, and I felt that it was a bit demotivating to kind of pinpoint like: "Oh, what? You want to change your goal? Why? Because it is too challenging?" You know, it was a little bit too direct… [It should be] more just "Okay, you want to change your goal, maybe it has been a rough month, you had a big project at work, okay. Let's just change the goal."

Moreover, her suggestion to change of the original texts conveyed not just her opinions about DirectLife's posture toward clients, but also more general views about cultural contrasts among the design team behind this new interface. The following are two excerpts from interviews with the copywriter, who is from the United States, and the Dutch marketing manager at NWS:

> Copywriter: I mean, it is also a lot about just cultural as well. I mean, because Philips is Dutch and the team is Dutch, most of them. Dutch is just a little bit more direct, which I appreciate but most Americans don't (laughs). Especially when you are talking about something like a fitness plan, which can make people very defensive or demotivated… They're very touchy. It is a touchy subject: fitness and exercise. Because then it is linked to being overweight, and sixty-six percent of Americans are overweight.

> It is a big issue and especially… maybe the market for this would be more women than men. And, you know, you want to motivate them, and help them. You don't want to be like: "Oh, is the plan too hard for you?" (laughs). That is like, really, people can be very sensitive about those kinds of things.

> Marketing manager: She is a native, sensitive, US lady. So, actually she is always very offended by the way how I write. Because the Dutch are really direct. There are so many cultural differences when you look to the US, that it is never working. So, I am very happy that she joined, and that she says: "No, no, no, you can't say that like that." [And I say:] "Ok, tell me how."

Naturally, interactions within the design team were not always grounded on visualizations of the goal adjustment interface. Nonetheless, this example demonstrates that these visual materials not only assist designers in debating morally appropriate ways of addressing clients through the DirectLife interface, but also serve as "internal" interfaces for the exchange of professional services and negotiation of attitudes and roles within the design team.

Software Codes: Inscribing the Final Form

At a particular point reaching the end of the development process, the decision was made to implement the goal adjustment interface as a new feature of the DirectLife website. The direct responsibility over this stage was given to NWS's software development team. In possession of various visualizations (flowcharts, visual designs, dynamic texts, etc.) that were judged sufficiently mature, these developers set out to materialize the goal adjustment interface in terms of the website's software codes.

One of the developers who had recently joined the team forefronted this initiative, and his initial step was to create a use-case scenario for the goal adjustment interface. Briefly, the creation of the use-case was useful for him to spot ambiguities in the extant visualizations of the goal adjustment interface, clarify misunderstandings within the design team, and specify in greater detail what the software codes should accomplish

for clients. Once created, this use-case concretized yet another perspective on the goal adjustment interface which, later, was useful for those in charge of testing and debugging the website before it went live.

Following the temporal sequence dictated by the use-case and the flowchart, the software developer then started to construct page by page of the goal adjustment interface in the Flash application. The final designs delivered by Philips Design were deconstructed into their graphical components and reconstructed from scratch as Flash objects. In this process, existing components that had been previously used in other parts of the website—parts of the history view graph, for example—were reused as basic building blocks to form the new interface. Other components, such as the slider used for selecting targets, were newly created.

The implementation of the slider object in Flash provides a good example of how designers visualize the goal adjustment interface through software codes. Figure 4.9 is an image taken from the video recording of the interview with the software developer who was in charge of Flash design. In this passage, he points to the lines of codes at the center of the screen (unreadable in the image) and explains how they were written to generate the slider object when the webpage loaded for clients:

> This is one of the important calculations, where you put the slider based on, in fact, what the average calories were the last three weeks [kcal_average_last_3_weeks], what are the lowest assessment and highest assessment values—that are the borders, left [low_safe] and right [high_safe]. And the recommended goal [recommended_goal] is also given. So, based on those figures I can draw the whole slider. (Text between brackets represents the variables highlighted on the screen by the interviewee.)

When a client logs on to the website, the software codes highlighted above are used to retrieve specific values from another file which, in turn, contain results from mathematical calculations applied to the client data that is recorded in the DirectLife database. Thus, every time the slider of the goal adjustment interface is actualized for a client, its specific configuration on the screen is determined in real-time by the underlying software codes that operate on his or her personal data.

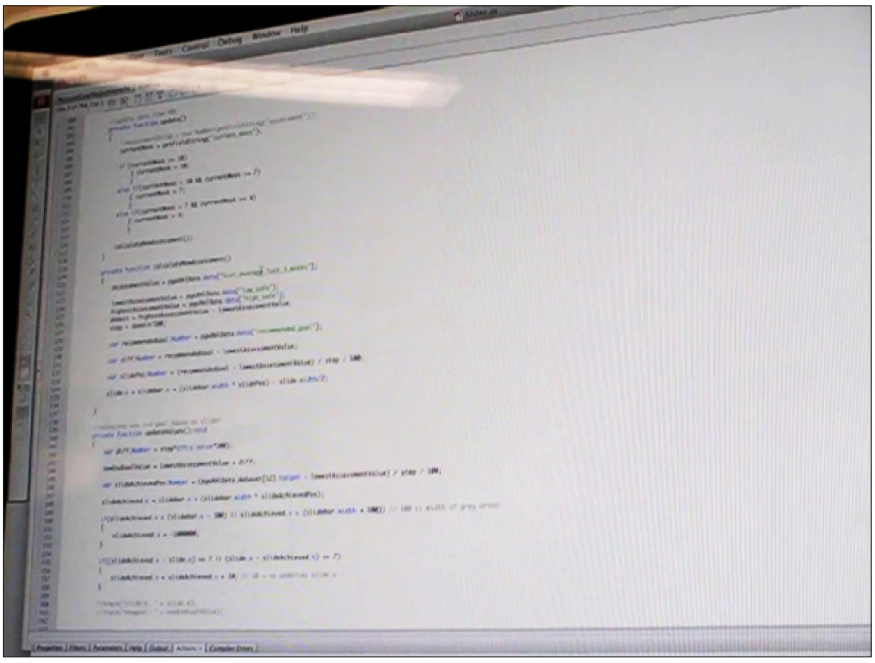


Figure 4.9. *Flash codes of the goal adjustment interface.*

To confer if the procedure above yields expected results, during the design process software developers regularly "built" the goal adjustment interface directly from the software codes. This resulted in visualizations such as the one seen in Figure 4.10. These simulations are created in the "demo server," which contains real client data but also "bogus" information to ensure client anonymity, including fake names. In addition, the demo server uses a copy of the software that is currently running the DirectLife website. This is done to prevent the integration of a new feature to the actual website before extensive testing.

Demo-server simulations like the one shown in Figure 4.10 are visualizations holding the greatest degree of isomorphism with respect to how designers envision the client experience of the goal adjustment interface to be. Yet these never convey the interface "transparently," because of the limitations mentioned above. Moreover, it is questionable whether demo-server visualizations could ever be deemed "closer" to the client experience just because they are isomorphic. This is because what

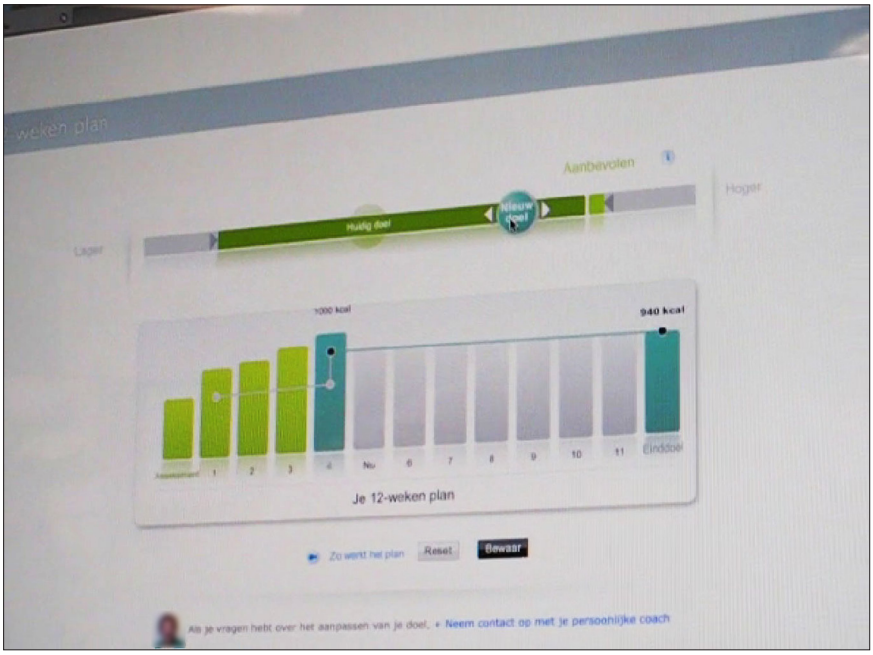


Figure 4.10. *Demo server visualization of the goal adjustment interface (in Dutch).*

software developers can interpret through this visualization is limited to what a single client will see at a time. However, developers also need to know if the interface will run properly for all clients, in every possible condition. Instead of building thousands of isomorphic visualizations in the demo server, which would be highly impractical, developers many times anticipate how the goal adjustment interface will be generated for clients by interpreting the software codes only, and these are mainly translational visualizations. Therefore, from a design perspective, the experience of visualizations as truthful depictions of the service interface is independent of them being isomorphic or not.

Trac Tickets: Debugging the Interface

Before the new version of the DirectLife website went live for clients, the goal adjustment interface underwent intensive testing by members of the software development team. This was done to guarantee that the software codes did not contain significant errors, or "bugs," that would

negatively affect the experience of the new interface by clients.

Testing involved much iteration. Early on, when materials such as the visual designs and early Flash demos circulated among the design team, software testers had only informal contact with the new goal adjustment interface. Upon seeing these first visualizations, they tried to foresee problems from the client perspective and started to devise a rigorous test procedure for debugging. Their hands-on involvement with the personal goal adjustment project came only at a later stage, when the new interface was getting implemented in terms of software codes. Subsequent testing, then, was basically structured according to the use-case mentioned before and carried out manually. Testers mimicked the expected (and less expected) behaviors of different types of clients, trying to spot incongruences between what they saw happening on the screen and what they expected clients would have experienced. At a later testing phase, automated scripts were devised for a more comprehensive examination of different usage scenarios.

Although the automated testing procedures for the goal adjustment interface had not been complete at the time this research was conducted, that did not prevent testers from spotting significant bugs in the goal adjustment interface that was about to go live. In earlier stages of implementation, these bugs were usually communicated to the software developers directly. At later stages, they were reported as "tickets" in Trac, the digital platform used for software development at NWS.

The tickets communicated in Trac provide an outlook of the various types of bugs discussed by members of the software development team, some of which relate to the client experience of the DirectLife website: a broken background image, missing footer elements, and so forth. In the case of the goal adjustment interface, several bugs found during testing were related to the algorithms that DirectLife used to calculate clients' activity targets in the program. Ticket number 4258, illustrated in Figure 4.11, presents one example

As seen in the yellow area, this ticket is a case of a translational visualization, depicting through written language the client experience of a webpage. The tester who wrote it tried to convey the situation of this potential user as concretely as possible, by specifying the browser

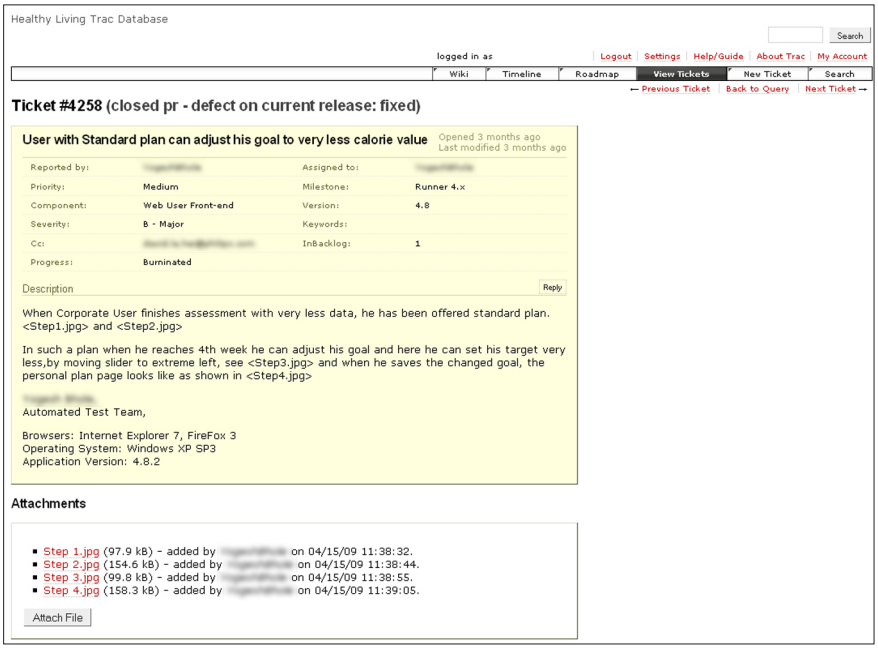


Figure 4.11. *Trac ticket of a bug in the goal adjustment interface undergoing testing.*

application, operating system, and website version that he or she would be using. To further clarify the description of the bug, the ticket includes references to files containing screenshots from the tester's own computer.

Looking at file "step3.jpg" (Figure 4.12), it is possible to understand what concerned the software tester. Here we have a client who might have forgotten to carry the activity monitor during and after the assessment week. He therefore has very low measured levels of physical activity compared to the target (the grayed-out line that is partly overlapped by the pop-up to contact the coach). In week four, as this client is given the opportunity to adjust end goals for the activity improvement plan, the interface allows him to set an activity target at absurdly low levels. For a client, the experience of a target line sloping down to 20 Cal would be highly counterintuitive, considering DirectLife's promise to help bring calorie expenditure up to a minimal level of healthy activity.

This particular bug was solved within a day's time and included in a subsequent revision of the DirectLife website. However, as seen

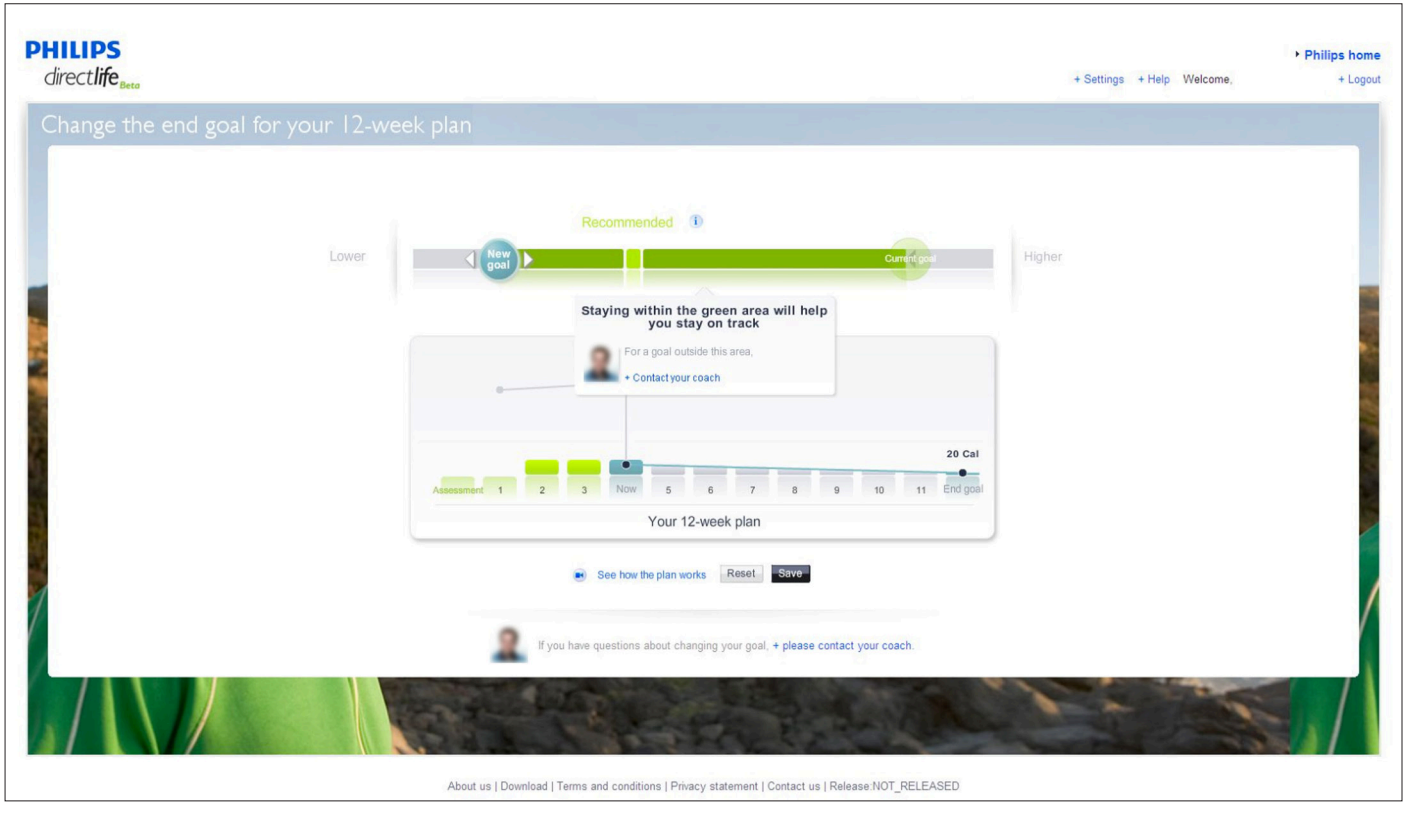


Figure 4.12. *Screenshot of a bug in the goal adjustment interface undergoing testing.*

below, bugs discovered during test procedures also propelled more thought-provoking changes to DirectLife's overall approach to health improvement.

Materializing New Algorithms, Reformulating Healthiness

As mentioned before, to generate the goal adjustment interface the DirectLife software uses several calculations applied on measured data from clients' physical activities. These mathematical formulas are called "algorithms" by the NWS staff. In order to calculate targets in the activity improvement program, DirectLife employs algorithms that convert caloric values adjusted to a person's weight, height, age, and gender to Physical Activity Levels (PAL) values. PAL values are used by the World Health Organization (WHO) as a way to stipulate recommended levels of daily physical activity to live a healthy life. The minimum PAL value indicating healthy levels of physical activity is 1.7. Using PAL 1.7 as a reference point, these are the conceivable physical conditions of clients in the DirectLife program: sedentary ($1.11 \leq PAL < 1.7$), healthy ($1.7 \leq PAL < 1.85$), fit ($1.85 \leq PAL < 2.0$), active ($2.00 \leq PAL < 2.20$), and sporty ($2.20 \leq PAL$).

Before the implementation of the goal adjustment interface, the DirectLife software generated activity targets for the end of the 12-week improvement plan as follows. During the assessment week, clients' activity levels were estimated to establish starting PAL values. Then, an increase of 20% over starting levels was applied in all cases, in order to come up with an end target. This end target always remained within the range of PAL 1.7 and 2.4, sometimes by imposing artificial limitations to the calculations performed. This guaranteed that clients would not exercise too much, nor finish the program below a healthy level of physical activity. Thus, when a client had assessment levels much below a healthy PAL value—say, 1.3—he would still need to get to PAL 1.7 at the end of twelve weeks, even if that meant an increase well above 20%.

When the time came to consider how targets would be calculated for the new goal adjustment interface, the initial idea was to derive algorithms from the ones currently used in the start of the program. More specifically, the idea was to allow those clients wishing to decrease

their end targets to set a new value representing at least a 10% increase in comparison to their starting levels. In turn, if clients wanted to increase their end targets, they would be able to set values up to 40% more in comparison to their assessment levels (the clipping of final PAL values falling below 1.7 and above 2.4 would be kept). If clients ventured beyond this "safe" zone, a pop-up would appear asking them to get in contact with their personal coaches to discuss their desired adjustments.

Although this approach seemed straightforward in principle, it soon became evident to the design team that the existing algorithms created problematic visualizations of the goal adjustment interface for clients, including the bug discussed in the previous subsection. The project manager of software development team explains some of these issues:

> We had to simplify the algorithms there to avoid a lot of corner-cases. Because the clipping of the goals, and setting a minimum and a maximum [goal] on certain conditions, then, in combination with goal adjustment within certain bounds… that created a lot of non-linearities in the algorithms and a lot of situations where things would be strange. Like, people only being able to set the goal to a lower value than they have currently, for instance. So, we were expecting a lot of issues from that. What we've seen in the past, if algorithms get too complicated, every time an issue comes up people need to analyze again, and dive into it, and try to figure out what on earth is going on. So, we simplified that a bit, which made the system a bit more predictable.

The simplified solution did not come straightaway, however, but was the result of intense discussions within NWS. Some thought that the issues noticed with the existing algorithms presented an opportunity for an overall reformulation of how targets were calculated in the program, in order to make them more easily reachable for clients. On the other hand, based on quantitative data about client performances from previous pilots, a member of the scientific affairs group saw no evidence that altering algorithms would help people to become healthier. A marketing manager at NWS thought otherwise:

> We always thought that 1.7 was too high for people that are very less active. [The member of the scientific affairs board] says: "No, I don't see any result in the research." Then, I say: "But I do see a lot of complaints in market research." And then she said: "Well, this is scientifically based." And then there starts a discussion about how much to rely on what you see or what you feel, or how you can value the input from ten users.

Eventually, a solution was reached by the design team and inscribed in the website's software codes. In "algorithmic" terms, it reads as the following equation:

$$\text{target[week n]} = \text{PAL assessment} + n * 0.15/12, \text{ for } 1 \leq n \leq 12$$

The end target of the 12-week plan is calculated for all clients as a 0.15 increase over their starting PAL values, as measured during the assessment period. Each subsequent week in the program has a target 0.15/12 higher than the previous week.

The new algorithm devised for the DirectLife program was able to reconcile divergent perspectives within the design team. But much more than a technical solution, it also materialized a new perspective on what constitutes healthiness and how the design team should think of their clients' efforts. Whereas previously clients had to reach a minimal healthy value of PAL 1.7 in order to succeed in the program, the new algorithms expressed a much more tolerant view. As the project manager for software development explains:

> …people who score very low will get a higher goal, but that goal might be below 1.7. So, in fact, they would need several plans to get at that [healthy] level.…I think if you are really a couch-potato and you have to get to this 1.7, being active, walking or cycling, half an hour to an hour a day, that is quite a challenge for a group of people, in my opinion.…I would say that everything you can improve there is good. So, if people become a little bit more active, change from a couch-potato to someone just above a coach-potato, that is also an increase. I would say that is good.

Moreover, the new algorithm and approach to activity improvement had implications at strategic levels, for instance, in redefining the main purpose of the DirectLife program for prospective corporate clients:

> …we dropped [the minimum increase in activity level to 1.7 PAL.] And that was a management team discussion, to say: "In some cases, it may be better to give people lower goals, so at least they reach it." But that means that commercially you cannot claim any longer that "we are bringing everyone to healthy," right? We are saying: "We are making sure that everyone at least improves, and some people may take two years to reach the healthy level, but at some point they will get there"….[This decision] has big consequences also in our sales strategy….Our initial promise was: "There is this healthy level, which is a personal score of 1.7 PAL. Our aim is to get everyone in your company to this level." That is a different message—it's only a fine-tuning—than saying: "Look, you have people in your company that score so incredibly low in activity! They are not going to go to a healthy level straightaway, but they are going to improve. And maybe it's just ten percent at a time, and they may need three/four programs before they are actually on a healthy level, but we believe that these small steps will take them there." So, it is just a little bit in what you promise….It's a different story. In terms of reducing health risks, it is just as effective. But it is just a different story to tell.

To conclude, bugs experienced during the implementation of the goal adjustment interface led to the reformulation of the algorithms used to calculate clients' activity targets. The change culminated in the reconsideration, from the part of the DirectLife design team, of what it means to help clients get healthy, as well as the market value of that promise. It might be that knowledge of potential shortcomings with the existing algorithms and of other approaches to activity improvement had been lurking around the NWS organization. But in order to realize these changes designers had to actually interact with the visualizations of the goal adjustment interface.

Discussion

In line with other empirical studies into the working practices of service designers, this study highlights the important role of materiality in the design of DirectLife. Building primarily on postphenomenological research into the visualization practices of scientists, I have described in detail the DirectLife design team's experience of various intermediary materials—mostly visual, but not strictly so—that depicted a new service interface for clients.

To some extent, that visual materials mediate designers' relations to the objects they create, is something already acknowledged in service design research (e.g., Blomkvist and Holmlid 2011; Diana, Pacenti, and Tassi 2009). Based on my interrogations over the postphenomenological notions of isomorphism and translation, however, I hope to have raised deeper questions regarding the relationship between design visualizations and the objects they are intended to portray. Following the perspective developed in this chapter, the designer experience of a new service interface through intermediary visualizations cannot involve references to the exact interface that will materialize only at the end of the design process. Rather, as seen in the case of DirectLife, visualizations of the goal adjustment interface may be interpreted on basis of references to various aspects of the design team's world, including other existing visualizations and webpages, foreseen client behaviors, previous professional experiences, and underlying software codes. It is on basis of these associations that visualizations of the service interface acquire their meanings for designers, serving purposes such as to test alternatives with clients, organize tasks and responsibilities during development, fine-tune and implement the final solution, and more.

On a broader outlook, a trajectory may be noted in the design of the DirectLife website, whereby later visualizations tend to convey more immediately the client experience of the service interface. However, none of these visual materials may be taken alone to be *the* service interface. All they offer the design team are multistable perspectives that together compose an impression on how clients might experience the new interface. What underlines the analysis presented here is not a direct comparison with the unmediated experience of the service interface *itself*,

which seems impossible, but that every novel visualization transforms how designers envision an interface they wish to make real for clients.

As shown toward the end of this study, although designers wanted the new goal adjustment interface to conform to their intentions, unexpected behaviors witnessed during the testing phase led to significant transformations of the target-calculation algorithms and overall approach to health enhancement. Postphenomenological researchers have already argued that technology always retains an influence on its own from not being fully reduced to the agency of designers. Ihde (2008, 19–30) even points to the "accommodations" that must happen between designers and materials in the process of shaping material technologies. Taking this insight up a notch, this study of DirectLife shows that the outcome of the entwinement between designers and visual materials is not just a "conformed" new service interface but also a "reformed" designer.

These considerations about the role of materiality in the practice of service design are a long way from the view that services are inherently immaterial and that design "tangibilize" a service for clients. In consonance with Kimbell (2011), this study approaches service design as helping to shape services as "socio-material configurations." However, the visualizations used for creating new services are more than "enablers" of value cocreation; they *are* the service for designers, as materialized and experienced at a particular moment of the development process. What needs counteracting is the idea underscoring metaphors of "orchestration" and "facilitation" that designers somehow operate from "above" or "before" service coproduction by providers and clients. When manipulating visualizations of a new interface, designers already find themselves as coproducers of this service, and from this position they are able to influence what new exchange relations are realized for all those involved.

Chapter 5
The Matter of Human-to-Human Interfaces: Design in the Service Factory

Chapters three and four mainly explored what was named the projective line of inquiry in the introduction of this thesis. I analyzed a service where client-provider relations are mediated by digital technologies. This approach is projective, in the extent that the emerging discipline of service design may apply interface design expertise coming from more established areas, e.g., interaction design.

Besides the ever increasing number of service interfaces comprising technological artifacts, like the ones discussed in the DirectLife case, there continues to be situations where services are created predominantly through interpersonal forms of contact relying on touch, gesture, physical demeanor, verbal communication, etc. Examples range from classroom education to therapeutic massage, from sports coaching to waitressing. Interpersonal encounters, however, sit traditionally beyond the scope of the design disciplines, and therefore demand an engagement through a more reflexive line of inquiry. Thus, the goal of the present chapter is to consider what an interface design perspective applied to interpersonal services may bring about in developing the discipline of service design into less explored directions.

As argued thus far, service design is a highly susceptible topic for postphenomenological analyses when the service interface includes digital technologies. Yet, postphenomenology is more ambivalent when it comes to the possibility of characterizing interpersonal service encounters from that same interface perspective. This chapter, thus, requires a different approach than the preceding two. Whereas previously I have used postphenomenology to conduct detailed empirical studies and to expand on service design theories, it is now postphenomenology itself that requires critical examination and elaboration. The thrust of the argumentation that follows is based on a close interpretation of the postphenomenological literature, in search of answers to the question

whether interpersonal services comprise a material interface. Could it be that services, even in the absence of other types of mediating artifacts, always rely on face-to-*inter*face encounters?

As a source of empirical evidence setting the stage for this study of postphenomenology, I rely on my participation in an innovation project organized by the Service Science Factory (SSF) of Maastricht University. In this project, an interdisciplinary team was set up to propose new solutions for strengthening the relationship between the Department of General Practice of Maastricht University (*Huisartsgeneeskunde*, or HAG) and general practitioners involved in primary care in the southern part of The Netherlands. Because the relations between HAG and external collaborators are usually based on personal interactions involving doctors, researchers and other medical professionals, this project was selected as an appropriate site for investigating the design of interpersonal services.

In the next section, I start by introducing the SSF-HAG project with focus on the final steps leading to the proposal of new service interfaces for the Department of General Practice. Then, after an in-depth study of postphenomenological theory, I will return to the SSF-HAG project to discuss the matter of human-to-human interfaces and to reflect on my personal application of design expertise in this specific project. Also in the final section, I will consider alternatives presented in the service design literature on how to deal with interpersonal encounters happening at the service interface and speculate about what a postphenomenological perspective may contribute to the discussion.

The SSF-HAG Project: Relationship Management in the Health Sector

Maastricht University's Service Science Factory is an initiative of the School of Business and Economics, and like other similarly named centers set around the globe, establishes bridges between the academic and business worlds in answer to a call for interdisciplinary collaboration in the area of service innovation (see IfM and IBM 2007). The Service Science Factory positions itself as a creative space and think-tank for addressing real-world innovation challenges following the principles of

service design. Specifically, its main activities revolve around setting up multidisciplinary project teams to improve existing or develop new service solutions within a strict time frame of approximately eight weeks. These teams normally comprise students, researchers, and other professionals from various disciplinary backgrounds, suited to the project in question.

Around the month of June 2011, the Service Science Factory started to recruit participants for a new round of projects, including the one concerning the future activities of the Department of General Practice. Integrating the Faculty of Health, Medicine and Life Sciences, this department is responsible for educating future doctors and other staff related to the field of general practice in The Netherlands. Besides basic medical education, HAG also provides vocational training, i.e., the specialization of general practitioners (GPs). Before any actual involvement of external participants in the SSF-HAG project took place, a number of meetings between the SSF management team and the clients representing HAG had already occurred with the purpose of defining the project's objectives. By July 2011, an eight pages long document with background information and a clear assignment was ready to be shared with the selected project team members.

To summarize the proposal, the Department of General Practice faced great challenges in involving GPs in collaborations of an academic nature. At that time, HAG had strong relations with twelve general practices in the area of Maastricht, called the "academic practices." These practices formed the core of their network and were involved in improving the quality of medical care in several ways: participating in research activities under the auspice of HAG, training students undergoing medical specialization at their practices, and teaching at one of HAG's educational programs. Besides those twelve practices, HAG collaborated with a lot of other affiliated practices for one or two activities, but not always on a structural base and not with the majority of potential general practitioners. More than fifty percent of the regional population of GPs was estimated to not collaborate in any of the academic activities mentioned above. Because of the growing need to find sufficient placement opportunities for aspiring doctors to complete their vocational training and because of the strains placed on the active practices, there

was a severe need to attract new participating GPs and/or practices. This condition was aggravated by HAG's limited understanding of the particular reasons why GPs preferred not to become active, as well as of successful ways to approach them and explain the benefits of doing so. The main goal of assignment was therefore to help the Department of General Practice tailor their service offerings in order to attract the target group of non-participating GPs.

The team assembled to work on the SSF-HAG project consisted of nine external participants: a bachelor student in industrial design, three master students covering the areas of organizational psychology, physiotherapy, and technology and policy, two PhD candidates in the field of healthcare, two university lecturers specialized on relationship marketing, and me. Completing the team, there was a project manager from the Service Science Factory and a representative from the client's side, who was also responsible for external communication and policy advice for the Department of General Practice.

I was introduced to the team as an industrial designer and doctoral researcher specializing in the field of service design. Already in the first meeting, I communicated my intentions of gathering data for my research and asked participants for their consent to record all group meetings and eventually ask them for their opinions about topics related to the project. I have not actively planned any intervention that could be directly connected to my background research interests at the time. In other words, although my participation in the project sprung from the motivation to study the design of interpersonal services, I did not try to steer the project in directions that might have been desired considering this motivation of mine.

The SSF-HAG design team worked together from September to December 2011, meeting at least once per week at the Service Science Factory office in Maastricht. Every member was expected to dedicate eight hours per week to the project, but the actual workload varied depending on the tasks to be performed in particular weeks and the specific competences of each team member. As usual in projects at the Service Science Factory, the design process was organized in four stages: Inspect, Define, Construct, and Deliver. In the Inspect phase, the team

became acquainted with background information and gained additional knowledge about the case through in-depth interviews with relevant stakeholders, including some non-participating GPs. In addition, a day-visit to one of the collaborating academic practices was organized. In the Define phase, the team analyzed the information collected, constructed a map describing the relations between HAG and other relevant stakeholders in the field of general practice, and created archetypical portrayals—also called "personas"—of some of the key stakeholders (e.g., participating and non-participating GPs). This phase also included an "energizer" workshop ran by an externally hired consultant who helped the team to find focus and plan the necessary activities for finalizing the project successfully. In the Construct phase, the insights coming from the preceding phases were synthesized in the form of a new service concept for HAG. An important activity in this phase was the creativity session organized by the other designer and me, which was intended to assist the team in generating innovative ideas and selecting the most promising ones for further development. Finally, in the Deliver phase, the new service concept was divided into different parts, refined by different participants working in sub-teams, and detailed for presentation as the final deliverables of the project.

The outcome of the SSF-HAG project was the result of a truly collaborative effort, to which all members of the design team, including the project managers from the Department of General Practice and the Service Science Factory, contributed important insights. For purposes of this chapter, however, I concentrate on my participation during the final stages of the project, in order to reflect on the application of design expertise in this particular service domain.

Toward the project's end, observing the ongoing development of final deliverables, it appeared to me that the results to be presented in two weeks' time could still be improved in two respects. First, the separate deliverables for the different parts of the new service concept were not described as coherently related to one another, nor to the overarching strategic vision. Second, the new service concept was not sufficiently framed as a solution to the initial assignment, nor was it explained as a logical result of the activities undertaken by the team.

To address both issues, I proposed two extra deliverables: a visual identity to be applied across the other deliverables, comprising a logotype, a slogan, and supporting graphical elements; and a slide presentation providing a general overview of the project and its outcomes. I created the visual identity and e-mailed it with instructions for application to the team members who worked on the other deliverables. The main storyline and text for the slideshow was created in my sub-team. To present the outcomes, I used the Prezi software.

The final presentation of the SSF-HAG project at the Department of General Practice was organized as follows. First, the materials showing the proposed service concept were predisposed around the corners of a large meeting room. Then, after all had arrived and been briefly welcomed by the project leaders, the presentation for the group started with the demonstration of the Prezi slideshow (Figures 5.1 and 5.2; the slides are summarized in Figure 5.3). Following this introduction, the staff of the Department of General Practice who were present circulated through the room, inspecting the different deliverables and asking for specific

Figure 5.1. *Presentation of the Prezi slideshow performed by me.*

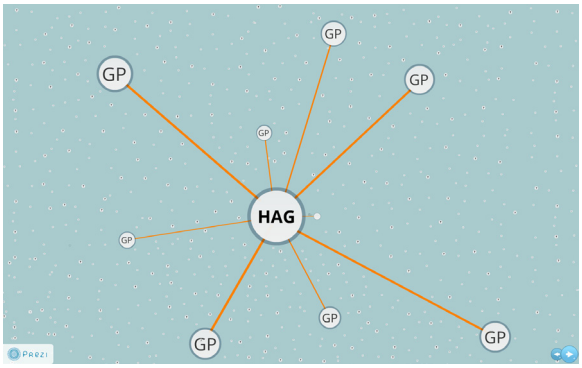
Figure 5.2. *Audience comprising the staff of the Department of General Practice.*

clarifications from members of the design team.

From the analytical perspective developed in this thesis, the "solutions" that integrate the *Join Our Family* communications plan may be approached as service interfaces between the Department of General Practice and prospective GPs. They include a website, a logotype, a magazine, an invitation token, a giveaway toy, a poster, a slide presentation, and a social networking webpage. Without explaining all in detail, or passing judgment on the quality of our proposal, it is still remarkable how little these interfaces elaborate on the dimension of face-to-face contact between the service provider and their clients.

The invitation token provides a good case for raising important questions regarding the design of interpersonal service relations. This token is a pivotal service interface for the Department of General Practice for attracting non-participating GPs, and its relevance is best understood in relation to the website. One of the main lessons coming from our preliminary analysis of the project was that HAG could coordinate more carefully its many communications with the outside world, which

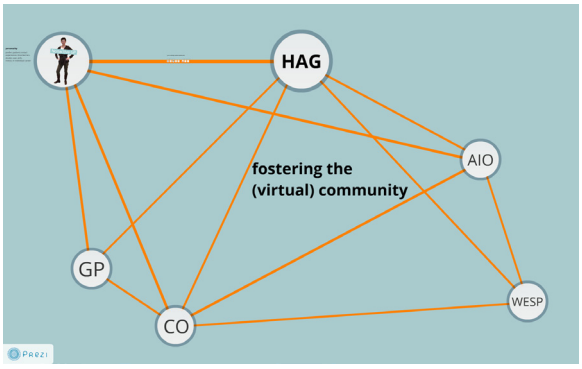
Slide 1 *shows HAG's central position in the context of general practice, with strong collaborations with a few GPs in the region.*



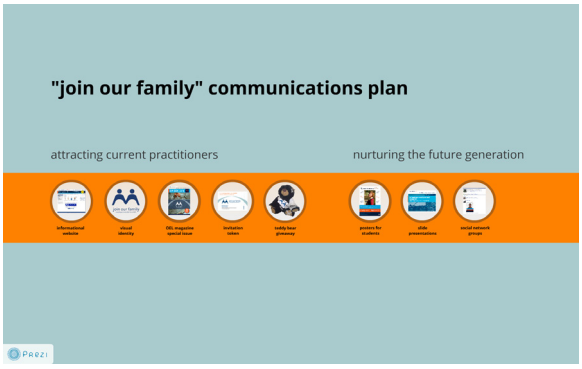
Slide 2 *zooms in one of these circles to depict the common traits of currently active GPs.*

Slide 3 *frames an area containing several question marks, showing that HAG knows little about GPs with whom no collaboration is in place.*

Slide 4 *describes the non-participating GPs and some reasons why they choose not to collaborate with HAG.*

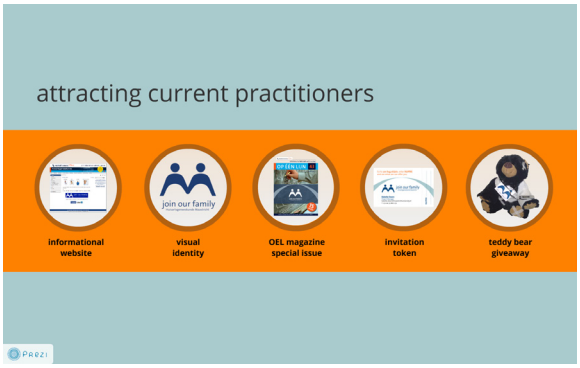


Slide 5 *portrays a strategic vision for HAG to foster a stronger sense of community within the field of general practice.*



Slide 6 *zooms in in the link between HAG and non-participating GPs, introducing the "Join Our Family" communications plan.*

Slide 7 *shows the first part of the communications plan, "attracting current practitioners," with solutions for HAG to reach GPs in the short-term and explain how their involvement can be adapted to their own ambitions and constraints.*



Slide 8 *shows the second part, "nurturing the future generation," with solutions for HAG to strengthen bonds with students in order to secure long-term relationships after they pursue their careers outside the university.*

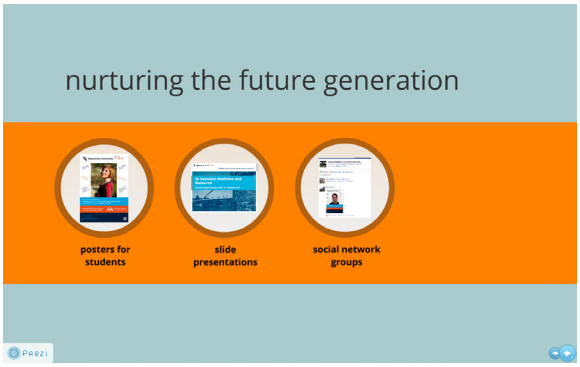


Figure 5.3. *Summary of the Prezi slideshow.*

were then conducted by different people within the organization, with different ends in mind. A central proposal of the new service concept was to revamp the existing website, in order to turn it into a coherent communication vehicle for the entire organization and primarily an instrument for recruiting new collaborating partners. Therefore, we proposed to restructure the website according to the main forms of collaboration (training, education, and research), in such a way that prospective clients would directly access clear information about benefits from collaborating. However, we were aware that many GPs, especially

the existing older population, are not very active online, but rely more on direct personal relations for gaining such information. The invitation token was therefore conceived as a way to overcome the perceived gap between the "real" and "virtual" activities of GPs.

The invitation token (Figure 5.4) is basically a business card to be used by "ambassadors" of the *Join Our Family* program during conferences, professional gatherings, and any occasion where they have the opportunity to meet in person with people they wish to attract into the HAG network. Differently from normal business cards, each invitation token features a unique code and a tear-off slip to be retained by the person who hands it over. When the token receiver later logs on to the web address indicated on the card and inputs its unique code, he or she will receive a personalized message from the ambassador who issued the invitation. This message would touch upon topics of their earlier conversation, suggesting opportunities for collaboration and presenting direct links to other pertinent information on the website. For this procedure to work properly, ambassadors could make use of the

Figure 5.4. *Invitation token for the Join Our Family program.*

invitation token's detachable slip to jot down notes that would be useful later, when tailoring their message for prospective clients. This way, the invitation token enabled the degree of personal contact in relations with the Department of General Practice that some GPs are accustomed to experiencing while, at the same time, it facilitated targeting the information contained in the website appropriately.

The invitation token represents a true mix of humans and technological artifacts materializing new service exchange relations between the Department of General Practice and GPs. Not only is the physical card necessary for recruiting new collaborators, but the personal performance of ambassadors plays a crucial role in this process. What requires pondering here is the imbalance in which the "paperly" and "humanly" dimensions of this service interface have been designed. While the invitation token was depicted in the Prezi slideshow and physically available as a mock-up for inspection during the final presentation, the performance of human ambassadors was only vaguely defined, both orally during the presentation and in written format for the final report. Few would contest that the invitation token was designed as a physical object, but could the same be said about the performance of ambassadors? Should the design team have specified in greater detail how these ambassadors would behave when meeting GPs face-to-face? What about the places they should attend and who to hire as an ambassador in the first place? Do traditionally trained designers possess the expertise to interfere on such decisions? And can we even thematize aspects of human involvement in services as an interface dimension to be purposefully manipulated?

Postphenomenology and the Human Body as Artifact

I would like to propose that answers to the questions posed above ultimately hinge on the possibility of approaching aspects of the human body, or closely associated with it, as *material artifacts*. It is my opinion that postphenomenological research contains fruitful hints for addressing the body as such. While I do not pretend to be exhaustive here, I will comment on Ihde's most explicit suggestions in that regard, when he compares the notion of *technique* (in the form of bodily skills) with *technology*.

But if it is the case that an approach to the human body *as* service interface may be borne out of postphenomenology, it is also true that Ihde's seminal work in the philosophy of technology, *Technics and Praxis* (1979), initially gets us stranded. Or has not Ihde dismissed the technological instrumentality of the body in that book with the argument that "all that is important….is to note that *if* the body were an 'instrument,' it is indeed a very different one that those we use" (1979, 80 n1)? That Ihde states this briefly in an endnote, is uncharacteristic of his argumentative style. Instead of describing phenomenologically, even if preliminarily, how the human body differs from the "instruments" he chooses for extended analyses, the difference here is simply presumed and further ignored.

In later works, even if the instrumentality of the human body gets acknowledged by Ihde as a form of "technique," this is at best in a derivative sense. The following quote from *Technology and the Lifeworld* illustrates this point well:

> …there may be techniques with or without technologies. A sexual "technique" is not in itself a technology (although, in a derived and secondary sense, if such a technique is modeled after some mechanical process, there may be an interpretive connection between the two). Equally, techniques may be closely related to technologies particularly regarding patterns of use (Ihde 1990, 26).

To gain a deeper understanding of how Ihde sees technique as related yet derived from technology, it is necessary to consider how he defines the latter term in a postphenomenological sense. And this is not an easy task considering Ihde's aversion to present succinct definitions. The closest Ihde might come to "defining" technology is in a preparatory passage of *Technology and the Lifeworld*, where clarifications about the concept are advanced before entering more detailed phenomenological descriptions later on (Ihde 1990, 26–27). In the latter passage, Ihde will describe the nuances of technological experience, always attending to the non-neutral influence of material artifacts from a position "in-between" humans and world. In the preceding clarifications, he holds that the *materiality* of technologies correlates with the concreteness of our own

bodies. Moreover, their mediating position is evidence of their *artifactual* condition, as the domain of experience that is not entirely encompassed by the human body, nor completely present as a worldly "other." If the latter were the case, Ihde argues, technology would be wrongly taken to be an "object" that can exist independently of particular contexts of human activity. On the other hand, equating technology with the "human" would carry the connotation of "technique," or a totalizing form of "practice and thought" that glosses over the concrete particularities of real-life situations. Therefore, from a postphenomenological perspective, what stands out as intimately associated with the concept of technology, not technique, is its *material artifactuality* in human experiencing of the world.

Is there a way, however, to conceive of technique as a material artifact? An answer to this question requires a close study of Ihde's analysis of embodiment human-technology relations, where technologies are taken "into" the human body as extensions of perceptual capacities. It is with respect to this kind of technological experience that Ihde presents the most explicit treatment of technique, by describing the origins and development of bodily skills.[41] When analyzing embodiment relations, Ihde sometimes points to the "fringe" awareness one retains of the concrete body and the fact that one must "learn" to accommodate the technology as an extension of perceptual capacities. As he writes about the process of embodying eyeglasses,

> The very first time I put on my glasses, I see the now-corrected world. The adjustments I have to make are not usually focal irritations but fringe ones (such as the adjustment to backglare and the slight changes in spatial motility). But once learned, the embodiment relation can be more precisely described as one in

41. To be sure, while Ihde will describe in nuanced ways the process of embodying technologies, the theme of bodily skills rarely occupies the center of his analyses. In part, the lesser attention to skills might be a result from an acknowledged dependence on Heidegger's paradigmatic "tool analysis." Ihde (2011) admitted to realizing only lately that Heidegger's account on the practice of hammering contains a "blindspot," insofar as the readiness-to-hand of the technology presupposes the previous attainment of handling skills by the user. He has also criticized Heidegger's negative appraisal of the typewriter on similar grounds, with the ironical suggestion that Heidegger never acquired the necessary skills to allow the machine to become as ready-to-hand as his preferred fountain pen technology (Ihde 2010a, 120–127).

> which the technology becomes maximally "transparent." It is, as it were, taken into my own perceptual-bodily self experience… (Ihde 1990, 73)

For Ihde (1990, 74), complex activities like automobile driving require longer bodily learning processes. Only in a few occasions does this learning process receive more attention than above, with the prominent case being the use of hand-held telescopes for scientific observations (Ihde 1998, 153–157). Ihde observes that when an object like the Moon is observed through the telescope, it is also transformed by it; what is experienced is displaced from its original context, magnified, and seen as containing mountains, craters, etc. This transformation caused by the telescope carries along a simultaneous bodily alteration, in the sense that one now has the experience of being "closer" to the Moon. Additionally, if the telescope user is a beginner, he will notice a certain wavering of the object, which reflects the micromotions of his own body. In order to "fix" the phenomena observed through the telescope, Ihde notes, users must be able to stabilize their bodies accordingly. Here, again, the point is that one disciplines the body in the attempt to obtain the sort of "maximally transparent," or semi-transparent, experience of the world that characterize embodiment relations.

However, two suspicions can be raised about this analysis. First, while Ihde contemplates the role of bodily skills as a way to complement his description of embodiment relations, the attainment of these skills originates in a *negative* way, requiring the obliteration of the body from the experience. Ihde holds that when a person first engages "embodiable" technologies, like eyeglasses and telescopes, the body gets explicitly noted in relation to an artifact that obscures a desired transparent relation to the world. Hence, novice telescope users realize that their hand wavering disturbs the stable display of the Moon. Then, in the process of becoming a skilled user, the technology tends to get incorporated into the experiencing body, at the same time that the bodily intrusion tends to disappear from the experience. In other words, the "artifactual" body of the beginner needs to vanish for the embodiment relation of the expert to obtain.

Second, in Ihde's analysis the acquisition of skills originates from bodily alterations that first appear as "fringe" phenomena that must be recovered reflexively from what is focal in the experience. Thus, in telescope-mediated seeing, the novice user experiences *immediately* the trembling of the Moon, and *reflexively* the bodily micromotions which prompt the development of handling skills. Ihde formulates this strict order of events in terms of a "noema-noesis" structure (1998, 155), and that signals to methodological considerations that were more fully explained in his earlier book *Experimental Phenomenology* (1986a). Although this is probably stated precociously here, I suspect that Ihde's secondary attention to the mediating role of the human body in technological experience can be partly explained by a special selectivity introduced by his method in that book. But explicating this point requires something of a long detour, and I will proceed in reverse order, commenting first on what I see as a positive outcome of his method in forefronting the importance of bodily skills, before showing what might be concealed by it.

Experimental Phenomenology presents a thorough introduction to the practice of phenomenology, accompanied by concrete studies of line drawings depicting well-known visual illusions. Although Ihde praises Husserl in the book for developing a useful method to discover the *essence* of phenomena, his own application of this method has yielded something else, namely, the *multistability* of visual phenomena. Ihde (2012, xi, xiv) later recognized not having fully grasped the originality of his finding at the time the book was written. In spite of that, the finding of *Experimental Phenomenology* was later adapted to investigations of technologies, leading to the comparable claims regarding the multistability of phenomena like oceanic navigation (Ihde 1990, 146–150), the camera obscura (Ihde 2012, 155–169), and archery (Ihde 2009a, 16–19; Ihde 2012, 171–184). It is the latter that interests us mostly in this text.

Archery, for Ihde, is one of the main applications of the more general bow-under-tension technology (the others are as musical instrument, fire-starting device, and saw). On basis of a long historical purview and worldwide outlook, Ihde claims that various cultures have invented the "same" technology of archery, which took multiple "stabilities" within

the particular contexts. Therefore, archery is multistable. I will not summarize Ihde's discussion of four multistable cases of archery, but simply note that he provides an unusually long account of the bodily skills attending to each usage circumstance. Hence, in the case of the English Longbow, the bowman stands up holding the bow with one arm stretched to the front, then pulls back the string while holding the arrow with all of his fingers; in the Mongolian Horsebow, the bowman, now mounted on a galloping horse, draws the bowstring toward his cheek as he simultaneously pushes the bow away from the body, also trying to synchronize the arrow's release with the moment where the horse's hoofs come off the ground; and so forth.

Although differences in bow size, material, reach, and additional factors are also mentioned in the text, when compared to other descriptions of technological activities, this discussion of archery is special because it grants bodily skills a prominent role in defining the "meaning" of the technology. However, the analysis also plays somewhat loosely with the boundaries between the "technology" and the "body." Should we understand that the bowman's skills integrate the "same" bow-under-tension technology that is analyzed in various cultural-historical contexts? If not, where exactly lies the boundary between the human body and the technology? From a postphenomenological perspective, if there is a boundary demarcating technology from the human body and all else, this must be determined by attending to the structure of the bowman's experience.

Yet, there are further complications for marking out the human body from the domain of the "technological." My allusion is to a recent stream of postphenomenological studies looking into the implantation of technological artifacts deeply into the human flesh.[42] Important to discuss here is Welton's (2006), whose main purpose is to extend Ihde's analysis of embodiment human-technology relations to more "cyborgian" forms of neurophysical integration, for example, when brain implants allow a person to regain eyesight. For this end, Welton sees it necessary to compare the late Husserl's notion of the human body with that of Merleau-Ponty.

---

42. E.g., Verbeek (2008); Welton (2006); De Preester (2010).

As Welton convincingly shows, Husserl's notion does not hold under theoretical and empirical scrutiny. Instead, he favors Merleau-Ponty's account on the human body, and drawing on refinements advanced in neuropsychological research he proposes two phenomenologically distinguishable, yet complexly entangled dimensions of experiencing. On the one hand, there is the *body schema*, which according to Welton

> …is not an object expressly known but only "tacitly understood." It functions not as object of consciousness because it forms the basis of or the hidden "background" behind all explicit intentional acts….The awareness that attends the body [schema] as it engages the world….is not a perception of the body (Welton 2006, 201).

And there are the *body images*, which in turn,

> …arise from an explicit perception of the body or, more generally, from out conceptions of the body and our feelings about our body. They are representations that arise when my body is taken as an object, for example when I look at my body in a mirror or gaze at the body of others, or when I describe the body that I see in the language of my culture, or when I assume a certain emotional attitude toward my body (Welton 2006, 201).

Welton, then, superimposes Merleau-Ponty's notion of the body onto Ihde's analysis of embodiment relations and adds a twist. He argues that when someone learns to hit a ball with a baseball bat, the embodiment process involves body images in that one starts by "visualizing" how the bat relates to the concrete body and the correct ways of holding it (Welton 2006, 203). As skills develop, the body schema gets transformed so to incorporate the technology, thereby making one capable of experiencing the hit of the ball at the end of the bat.

A point to emphasize here is that by presenting a two-pronged notion of the body in relation to the incorporation of technologies, Welton implicitly provides a more discerning analysis of the acquisition of skills, slightly different from Ihde's. When first encountering a baseball bat, Welton portrays an aspect of the body "reaching out" toward the technology as a way to initiate the process of embodiment, rather than

"intruding" upon an existing human-world relation. Hidden in Welton's analysis is a more explicit role of body images in stirring the process of skill acquisition. However, even if in his example the human body becomes more positively valued as an "artifact" in the experience, as skills develop the body image ends up disappearing into the extended body schema that now encompasses the technology.

Welton himself has not directly discussed any postphenomenological notion of the body. But in a response to Welton, Ihde (2006, 284–285) applauds the criticism of Husserl and positions himself also closer to Merleau-Ponty. To understand Ihde's positioning, it is necessary to recall that in the book *Bodies in Technologies* (2002) he has, too, presented a two-fold account on the human body. There, a difference is made between the notions of the *here-body* and the *image-body*; the here-body being defined as the "quasi-primary", "fully sensory" body, and the image-body as the "partially disembodied", "quasi-other" dimension of the body (Ihde 2002, 3–15). Ihde sees a dialectic existing between these two dimensions of the body that is, in principle, similar Welton's explanation of Merleau-Ponty's views. However, in the passage quoted below, Ihde provides an ambiguous explanation of the here-body that could undermine the declared affinity:

> It is the here-body in action that provides the centered norm of myself-as-body....it should also be noted that such a body experience is one that is not simply coextensive with a body outline or one's skin. The intentionality of bodily action goes beyond one's bodily limits—but only within a regional, limited range. A good example may be taken from martial arts experience wherein one can "feel" the aimed blows even from behind and aims one's own activity beyond any simple now-point. One's "skin" is at best polymorphically ambiguous, and, even without material extension, the sense of the here-body exceeds its physical bounds (Ihde 2002, 6).

The passage is telling because Ihde points to the body's ability to "extend" its experiential reach without the use of other technological artifacts. The same example was discussed before slightly differently in *Technology*

and the Lifeworld (Ihde 1990, 74). There, the example was presented next to the discussion about embodiment relations, which suggests that karate skills might somehow be "embodied" like other forms of technological artifacts. In the context of *Bodies in Technologies*, however, the point is made to accentuate the malleability of the here-body. But the argument becomes problematic in view of Welton's disambiguation between the two phenomenological senses of the human body. This is because Ihde first writes that "one's own activity" (i.e., karate blows) may be extended beyond the outline of the skin *as here-body*. Then, he states that karate blows can be "aimed," which would seem to require having some experience *of* them. In Welton's vocabulary, Ihde apparently means that the karate blows integrate the *body schema*, which establishes a tacit background and not object of the experience, while at the same time they are explicitly perceived as the *body image*. This interpretation is supported by the following sentence in the succeeding paragraph:

> …one can simultaneously experience one's here-body *from its inner core* while having a partial, but only partial, "external" perception. (Emphasis added.)

But if I am able to experience my *here-body* would that not make it paradoxically my *image-body*, to use Ihde's terms? Are not the skillful moves of martial arts practitioners best defined as the partially disembodied body, an image-body? And is not this image-body a material artifact that contributes to structuring one's experience of the world?

After this long detour, I can now return to and explain the previous suspicion that Ihde's inconclusive treatment of bodily skills could be an ill-fated outcome of the methodology introduced in *Experimental Phenomenology* (1986a). In this book, Ihde discusses the basic phenomenological notion of *intentionality*, which according to him accounts for the aprioristic correlation between humans and world which grounds all possible forms of knowledge. Following Husserl, Ihde names this correlation with the terms *noema*, for what is experienced, and *noesis*, for the mode of experiencing that which is experienced. He further clarifies the empirical order of the relation, stating that the noetic domain cannot be known directly, but only reflexively after the

examination of the noematic one.

The claim for the priority of the noema is initially supported in the book with a brief example of a technological activity (Ihde 1986a, 48). When chopping wood with an ax, Ihde writes, "my primary energy and concentration is focused *almost* totally in the project itself....'I' should be put roughly as 'I-am-in-the-ax-directed-towards-the-wood'." In other words, the "I" as the bearer of the experience is mostly implicit in the technological activity. For Ihde, this is not to say that any sense of "I" is definitively ignored, but that it remains mostly in the noetic domain, and therefore must be fully recovered only in a second moment in the analysis, after careful attending to the noema: "The 'I', particularly in its thematized form, comes late in the analysis rather than being given as a first."

By making the "I" mostly unknown, at least at a preliminary level of analysis, Ihde effectively "black-boxes" the human body. One strategic reason he provides for doing so is to avoid the naïve sense in which the "I" would seem to arrive first in inadequate forms of introspective analyses (Ihde 1986a, 50). However, in equating the concrete body of the wood-chopper with the "I," the move is one that automatically submerges any bodily skills that this person might employ into the noetic domain as well. The same occurs as Ihde proceeds in the book with more sophisticated analyses of visual illusions to elaborate his methodology.[43] In all of that, he continues to hold that bodily skills remain within the bounds of the noetic domain, and therefore to be recovered reflexively.

To conclude, my point is that it is possible to draw on the finer distinction regarding the human body introduced by Ihde in *Bodies in Technology* (2002), and associate the type of bodily skills discussed earlier in *Experimental Phenomenology* (1986a) with the notion of the image-body. Because Ihde did not realize the possibility of treating the image-body as noema, the whole human body was roughly conflated into the noetic domain. This elimination of the body from the focal plane

43. Because this part of Ihde's book has not been systematically connected to descriptions of technological practices, I will refrain from discussing it in detail. However, in my opinion, is precisely here that Ihde offers the richest phenomenological description of how one acquires and purposefully applies a bodily skill. Basically, through instructions carefully given in text, readers are able to tap into sedimented habits of seeing, in order to confront them, and develop new abilities to interpret visual phenomena (Ihde 1986a, 67–121).

of experience carried over to Ihde's philosophy of technology of later works, where "technology" became roughly equated with the noematic pole of experience and "human" with the noetic one (see Ihde 1983, 3). As a result, bodily skills could never be analyzed as a genuine form of mediating artifact, but had to be derived from experiences with other sorts of material technologies.

Expanding Service Design's Horizons

The previous section demonstrates that submerged in the postphenomenological treatment of skills rests the possibility of approaching partially disembodied dimensions of the human body (i.e., image-bodies) as material artifacts. I now want to propose that these artifacts, which are addressed here under the general rubric of *human technique*, comprise the interface that is the object of design in interpersonal service encounters. The term "technique," however, casts a broad net and must be taken as an approximation only, rather than a precise descriptor of all possible forms of human-to-human interfaces in services.

As Pinhanez (2009b, 1) simply puts it, "service systems have *humans inside*." For Penin and Tonkinwise (2009, 4327), it is the "design *of* people" that differentiates this practice from all other forms of design. Whether these statements are accurate or not, the fact is that the service design literature expresses various opinions on how to deal with an interpersonal encounter happening at the service interface, from blatantly ignoring its peculiarities, to treating it as a novel component in designable systems, to safeguarding it as a definite "no-go" area. The invitation token introduced earlier in this chapter offers the opportunity to comment on some of these views and speculate over the desirability, and even possibility, of designing interpersonal service interfaces.

From one perspective, it would be possible to describe the invitation token as an "enabler" of new service relations between ambassadors and non-participating GPs. According to this view, the token was designed not as a way to predetermine the human performance of those interacting through it, but to create a platform for interpersonal services to be defined and exchanged. The card materializes the exchange only in part, whereas the technique of using it is left open to be determined by the

people entangled in the service interface.

One potential shortcoming of this perspective is to reduce the role of materiality to that of a mere support, overlooking the fact that humans are still indirectly "designed" through it in significant ways. The invitation token is not a neutral means for establishing relations between the pre-existing figures of "ambassadors" and "non-participating GPs." On the contrary, the token helps to define people who handle it in these precise roles, by establishing the notion that one person currently belongs to a greater institutional initiative while the other not.

Moreover, by concentrating on the invitation token only as physical card, and thus disregarding the human performance as another interface object, the tendency is for designers to frame their practices according to traditionally held views and not original perspectives that might be instigated by the peculiar materiality of human-to-human interfaces. For example, owing to my previous training as a graphic designer, the invitation token was primarily framed as a problem of creating "visual identity." Consequently, the graphical distinctiveness of the solution, its metaphorical allusion to the organization's identity, the flexible application in various supports, etc.—all these issues guided the design effort. In the process, additional issues that might have reflected a greater attention to the techniques to be employed by ambassadors were deemphasized.

The same tendency of remaining within the confines of an already established practice occurs in some service design projects oriented at social innovation (e.g., Jégou and Manzini 2008). Despite the rhetoric around novel forms of societal intervention, what the concrete case studies show as immediate design deliverables invariantly fall back on traditional materials: electronic displays, signage systems, indoor spaces, and so forth. By any means is this undesirable. Designers should continue to find expression for their established expertise in new fields. But in overly doing so, an opportunity might be lost to address the complexities of designing the human techniques that are integral to innovative forms of social relations and crucial for the continued development of the practice of service design.

On the other hand, there are salutary initiatives to furnish service

designers with a wider set of competences for dealing with the human matter, for example, in attempts to appropriate conceptual frameworks and tools from theater (Penin and Tonkinwise 2009), organization development and community action research (Sangiorgi 2011), and even from earlier participatory design approaches in the field of human-computer interaction (Holmlid 2009). These advances might become handy in the future for designing new service interfaces based on human interaction. But, as the authors themselves recognize, these promises are still in need of critical examination and successful integration into the working palette of service design practitioners. Looking back at the presentation at the Department of General Practice (Figures 5.1 and 5.2), I am left to wonder how the sober audience would have processed strict guidelines for using the invitation token coming from a designer with no professional experience in the field of health care, who had produced these results through some "artsy" theatrical exercise.

An alternative, of course, is that designers do not see to themselves the task of specifying the human-to-human service interface, but facilitate appropriate solutions to emerge from those holding the right competence for doing so, particularly those who will be actually involved in new forms of interpersonal exchange. This is the approach taken by advocators of "codesign" (e.g., Cottam and Leadbeater 2004), who rely on workshops involving relevant stakeholders in the joint creation of solutions for new or improved services. A problem area remains, however, on how to scale up solutions beyond the workshop and its small number of selected participants. In other words, to involve a group of ambassadors in the definition of proper techniques for using the invitation token would not have dispelled the political question concerning who is in position to dictate how the rest of ambassadors should behave.

On a deeper level, the issue to be raised is whether there is *anything* to be deliberately specified and manipulated in situations where services providers and clients meet in person. Space must be reserved here for outlining Cipolla's (2005) argument, which thus far is the most concerted challenge to a design approach centered on the service interface. Drawing on the philosophy of Martin Buber, Cipolla proposes that every service relation may be described either in terms of an "I-It" or an "I-Thou"

encounter. In the former case, identified as "standard services," clients and providers perform according to a predefined set of scripts. In standard services, experiences are limited to an encounter with a previously defined "object" and readily fall under preconceptions or existing frames of reference that are held by the participants involved. An example would be the interactions between a bus driver and school children, where service exchange is mediated by the generic technical skills of the driver and even hindered by signs instructing passengers not to interact with her (Cipolla and Manzini 2009, 47). In the case of "I-Thou" encounters, which Cipolla names "relational services," interpersonal relation happens immediately, with no interposition of extant concepts or other mediating objects ("Its"). Only in the case of relational services do human beings have the possibility of developing a genuine individuality, by being confronted with the full presence of an "other."

Granted, many of the interpersonal relations that populate our daily experiences are not readily amenable to categorization under the interface paradigm. Family relationships, advice from a spiritual leader, and sexual encounters between lovers are not the types of interpersonal relations easily falling within the scope of design. These are not the type of relations usually considered to be services either. The difficulty in determining the boundaries between interpersonal services and other forms of human-to-human contact is not much different than that of discerning between technologies and other sorts of material artifacts, including worshiped objects, artworks, and natural found tools.

For Cipolla, relational services cannot suffer the intervention of any "in-between" element without having its special qualities destroyed. For this reason, interpersonal encounters should only be "meta-designed," by carefully managing the conditions for their emergence and sustenance (Cipolla and Manzini 2009, 49–50). A similar position would appear to underline a widely circulated document calling for reform in public services by design (Parker and Heapy 2006). In this document, the authors propose several indirect ways for influencing the performances of human providers at the service interface, for instance, by recruiting empathetic employees, instilling abstract values on relationship management, motivating them to learn from one another, creating pleasurable work

environments, rewarding high-performing teams, and so forth. But as long as these actions can be linked to the motivation of influencing their personal contact with clients, are these not manipulations of the service interface, albeit of an indirect and unspecific kind? As Singleton (2009, 4305) cautions, the discourse on participation, enablement, and cocreation can also serve to sedate potentially more radical initiatives to transform business and governmental services through service design.

I join those who decry manipulations of interpersonal relations in services that are meant to manifest inauthentic character, degenerate community bonds, hinder personal autonomy, and alienate people from the products of corporal work. However, these are not the only results of purposive interventions at the level of human-to-human service interfaces. The services produced by firefighters would appear to present the antitheses for all of the above, even though many of the techniques manifested at the interface are strictly defined and controlled.

The identification of human technique as a design object allows space for a judicious treatment of interpersonal service encounters. It may even facilitate this treatment, by bringing to the fore manipulations that must happen anyway and opening them to careful reflection. The service provided by designers, too, in being materialized partly through the application of techniques in close interaction with clients, is object to such a reflection. By making the matter of human-to-human interfaces a topic of conscious deliberation, designers may not only devise new services to be realized by others, but also problematize their own rote application of techniques from the past, styling their professional practices in new and interesting ways. The human interface affords the design of better service designers.

Chapter 6
Conclusion and Discussion

This concluding chapter consolidates the main contribution of the thesis in advancing the discipline of service design and discusses two implications for the areas of service research and industrial design that demand future attention.

As mentioned in the introduction, recent decades have witnessed substantial academic research on services springing from disciplines as diverse as economics, management, and engineering. Yet, service design continues to be a poorly explored topic. In my view, this condition can be partly attributed to the limited participation in service research of industrial design and related disciplines. In fact, until very recently industrial design approached services as if they were mere appendages to goods. It is not uncommon to still observe in design discourse the surreptitious inclusion of services in expressions like "product (and service)," "product/service," or "product-service," without a deeper explanation of the meaning of these compound terms. The fixation on goods is understandable, considering design's historical role in giving shape to the material culture of modernity. But since the advent of post-industrial societies, the half-hearted integration of services into design discourse is increasingly out of touch with the times.

Lately, a movement within the design community has been forming to address the topic of service design. These efforts, however, remain largely circumscribed to a small group of researchers and practitioners, and still need to be disseminated in the broader arena of service research. The at best peripheral position of the design community in this field may be gauged from the outcome of a recent call for multidisciplinary collaboration under the heading of "Service Science," also known as SSME (Service Science, Management and Engineering) (IfM and IBM 2007). In spite of an initial idea to integrate an extra "D," for "design," into an expanded SSMED acronym (2007, 4), to date, the contribution of

those with a design background has been little.[44]

This thesis seeks to strengthen design research in services by better acknowledging matters of the service interface. As explained before, the proposal to carefully manage the material interfaces through which service providers influence clients' experiences was originally made by Shostack (1982), in marketing. Pacenti (2004), in turn, was the first to underpin the service interface concept with industrial design theories, more precisely, coming from the field of interaction design. With Pacenti, a way is paved to approach the design of services primarily as the design of interfaces and to extend expertise in designing interactive artifacts to the service sectors. Assuming that in the years to come computer-enabled interfaces will continue to mediate client-provider relations in a vast number of services, industrial design can still make a momentous contribution to service research, which thus far mainly conceives of the interface as a secondary matter. For example, Apple's iPhone is constantly described as a platform for the delivery of services embodied in apps and so forth, and this is usually mentioned as a sign of the growing importance of extending design efforts to services. Not sufficiently acknowledged is the fact that these services must *necessarily* be actualized for clients through the iPhone's interface, and that Apple has been immensely crafty in designing this client-interface relation in such a way as to reap significant profits from others who want to reach their clients through the interface they gatekeep. The iPhone is a true testimony that designing a new interface "can mean the opening of a new market" (Marzano 1992, viii, my translation from Italian).

The service interface is the ultimate object of design, because that is where every new service materializes in the embodied experiences of those who coproduce it. I have argued in this thesis that postphenomenology deepens our understanding about the design of service interfaces. With the empirical studies of DirectLife, departing first from the perspective of clients, I showed that more than simply being used by people as something ready-made for them by a service provider, the interface co-constitutes these people in the role of clients in an exchange relation,

44. Exceptions are Evenson (2008); Holmlid and Evenson (2008); Mager and Evenson (2008).

also transforming in non-neutral ways how their bodily and social identities are experienced. Then, turning to the designer perspective, I described how a new material interface is experienced through various visual materials generated during the service development process. The analysis highlighted that, as much as clients participate in the production of a new service by interacting with material interfaces, designers too are entangled in this process of coproduction. The visualizations of an improvement to the DirectLife interface materialized for designers a new service and partly determined how they conceived of their relations toward clients. It is by manipulating material interfaces that designers are able to create new service realities and also be recreated in the process.

However important the case of digital technologies might be for making design better attuned to the task of creating new services, framing service design as a corollary of the discipline of interaction design would be limiting. With the empirical study of the Service Science Factory project, I have extended the interface perspective into the domain of human-to-human service relations, in order to reflect on the particularities of designing an object (i.e., human techniques) that does not fall within the traditional scope of the extant design disciplines. In my opinion, interpersonal encounters present one of the main challenges for design in the service sectors and a great opportunity to address the question "What is special about designing services?"

Deepening the Goods-versus-Services Debate

At a final stance, the emerging discipline of service design cannot avoid the vexing question facing every other discipline attracted to the topic of services: What are they? The question eventually boils down to a quarrel about the differences between a service and a good. As a newcomer to the debate, design must take to heart previous successes and failures in attempts to disambiguate between the two. If there is anything to be learned from these attempts, it is that "breaking free" from goods-centered paradigms is never simple.

In the field of economics, for example, Gallouj and Savona (2008) have documented the evolution of service innovation studies, which begun with an "assimilation" approach, where theories initially formulated for

the manufacturing industries were employed to account (if only partly) for innovation in the service sector. Later, innovation studies moved to a phase of "differentiation," when services were found to harbor particular patterns of innovation that had previously been overlooked. Today, studies are stabilizing in the "integrative" standpoint not to differentiate between goods and services, because comparable forms of innovation are said to occur in both cases.

The discipline of services marketing, on the other hand, was initially firmed by hammering in the idea that services are essentially different from goods by virtue of their intangibility, heterogeneity, inseparability, and perishability.[45] Then, after sufficient criticisms had mounted on the alleged differences,[46] room was created for the emergence of an alternative view encompassing both goods and services, which many in marketing and beyond now embrace: the service-dominant (S-D) logic (Vargo and Lusch 2004a).

Service design must not import any of these viewpoints uncritically. According to the S-D logic, for instance, goods are subsumed as mere "mechanisms" for the exchange of "service," which fundamentally rests on "competences" of a primarily intangible kind (i.e., knowledge and mental skills) (Vargo and Lusch 2004a, 8–9). At some abstraction level, it may be advantageous to dismiss, in view of an overarching framework, potential differences between market offerings that are traditionally called "goods" or "services." But I suspect that few practicing service designers would be content in knowing that devising a new hospital bed and a new surgical procedure amounts to one and the same thing! What is needed, in addition to being capable of taking account of both goods and services, is a common framework that does not succumb to the temptation of explaining one in terms of the other, overlooking patent differences from a design perspective.

Earlier in this thesis, I concluded that the distinctive characteristic of services is the material *heterogeneity* of their interface. This statement needs to be further clarified, also to prevent confusion with how the

---

45. E.g., Zeithaml, Parasuraman, and Berry (1985).

46. E.g., Edvardsson, Gustafsson, and Roos (2005); Lovelock and Gummesson (2004); Vargo and Lusch (2004b).

word "heterogeneous" is used in marketing to denote the perceived lack of standardization of service delivery. The heterogeneity of the service interface, in my understanding, is justified by contrasting the experience of it with what goods are commonly purported to be. The latter, at least on first appearance, are homogeneously perceived to be "autonomous" objects.

The complicating issue is that upon closer examination a good never exists autonomously, but is always enmeshed in human practices involving those producing and consuming it. We may take the pen used for drafting this chapter for a brief postphenomenological analysis. Upon seeing the pen, I am reminded of the person from whom I received it as a gift. Because it was the first fountain pen I ever used on a regular basis, it influenced my handwriting considerably, compelling me to develop new handling skills. The concavities found on the pen's section close to the nib provide indications of where its designers suggest my fingers to be placed for optimal performance. The brand name engraved on its outer cap speaks of the quality of German product design and engineering. This pen has also placed me in embarrassing situations while supervising design students, when they borrowed it to sketch some ideas but hardly managed to get a well-formed line. In sum, this pen is already "heterogeneous," in the sense that its significance and value for me does not reside in its isolated existence, but on interactions happening at different places and time and connecting me to other social actors, including its manufacturer. And yet, I do not feel especially inclined to call this artifact "service."

Every attempt to define goods differently from services, to remain valid, must make a caricature of what material artifacts truly are. I do not have space to substantiate this point more fully than to reference the contributions of Hill (1999) and Gadrey (2000) in the economic literature. Hill (1999, 427) defines goods as "entities of economic value over which ownership rights can be established."[47] According to Hill, if ownership rights can be established, then goods are also "tradable," indicating that they are "distinct entities which are separate from their

47. He also makes a distinction between "tangible" and "intangible" goods that is irrelevant for the present analysis.

producers or owners" (1999, 427). While Gadrey notes an important complication with Hill's notion of "entity" (2000, 378–380), he does not provide an alternative to Hill's characterization of goods. Instead, he proposes a new definition of services, after analyzing several limitations with the existing ones:

> The economic production of services is reckoned to take place.... when an organization A, which owns or controls a technical and human capacity (this latter can also be denoted by the term "competencies"), sells (or offers without payment in the case of non-market services) to an economic agent B the right to use that capacity and those competencies for a certain period in order to produce useful effects on agent B or on goods C that he owns or for which he is responsible (Gadrey 2000, 384).

Since goods, as Hill defines them, could also be treated along the terms above as "technical capacities" that are "sold" by "organization A" to "agent B," in order to produce "useful effects on agent B or his goods C," it follows that the distinctive feature of Gadrey's definition depend on services *not being separable entities over which ownership rights can be established*. In other words, "agent B" must not own "organization A's capacities" in any strict sense, because if that were the case this agent would be purchasing a good, not a service. However, the criteria of ownership and separability does not help to elucidate what goods are, for it appears that any economic entity that is deemed "separable" and predisposed to "ownership" may thus be indiscriminately treated as a good—minerals, airplanes, paintings, software, slaves!

Verbeek (2011, 13) recently noted that critics of modernity (Heidegger and Latour) argued that the metaphysics that strictly demarcates between human "subjects" and nonhuman "objects" conveys the entrenched belief that "human beings are active and intentional while material objects are passive and instrumental." The difficult question that remains to be answered is: "Why are there circumstances where it becomes more problematic than in others to reduce certain economic entities to the status of an autonomous object?"

Rejuvenating the Tradition of Form-Giving

For service design to claim a stronger position in service research it is also important for the budding discipline to delve deeper into the greater tradition of industrial design. The history of industrial design is marked by an unsettling quest for new areas of application which mirror the current move into the service sectors. Just to cite two classic cases bearing some resemblance with the design of service interfaces, there is Peter Behrens, who in the beginning of the twentieth century built for the AEG factories, teakettles, streetlamps, gardens, typefaces, advertisements, salesrooms, and so forth, and Otl Aicher, fashioning pictograms, posters, uniforms, tickets, brochures, badges, regulations, etc., for the 1972 Munich Olympics.

To help establish this dialogue between service design and industrial design, it is perhaps worthwhile to revisit an old definition by Tomás Maldonado, for whom to design is "to coordinate, integrate, and articulate all those factors that, in one way or another, are involved in the process of constituting a product's form….both factors related to the use, fruition, and individual or social consumption of a product…and related to its production…" (1991, 14, my translation from Portuguese).[48]

This definition anticipates a consensus among design historians today that design mediates between forces of production and consumption.[49] Adding to the present understanding, Maldonado cuts more expressly to the kernel of how industrial design operates this mediation. Differently from other practices that get entangled in the production-consumption complex, including managing, selling, using and curating, design specializes in *form-giving*. The suitability of this generic definition, as Maldonado observed, depends on acknowledging that particular socioeconomic contexts always influence concrete design practices, by determining which factors become relevant in the process of constituting form.[50]

---

48. This definition was initially proffered by Maldonado in the 1961 meeting of the International Council of Societies of Industrial Design (ICSID), in Venice. It was later adopted by the ICSID at the end of the 1960's, altered, and presented as cited here in the 1976 original edition of *Disegno industrial: Un riesame* (see Maldonado 1991, 9, 13).

49. See Fallan (2010, 52).

50. "However, we must add: [the definition] is only valid provided that it is admitted that the activity to coordinate, integrate, and articulate the various factors is always strongly

Without necessarily following Maldonado on the regulatory strictness of socioeconomic contexts, I still want to take some liberties with regard to his definition and propose that, from a postphenomenological perspective, a "product's form" is the material interface between production and consumption from the embodied perspectives of those involved. This move helps me to situate the ongoing discussion about interface design in services within a broader framework. In the forming years of the industrial design profession, this practice was progressively targeted at mass-manufacturing interfaces in the form of material goods. As we enter post-industrial economies, what becomes the form of services? An immaterial interface?

The turn to the post-industrial era and the impact of immateriality on design were the main themes of a special double issue of *Design Issues* appearing by the end of the 1980's.[51] The article authored by Moles (1988), in particular, foresights relevant issues relating to how designers might carry on their form-giving practices in services.

Moles' essay contains strikingly contemporaneous remarks, today, when we are invited to move more and more of our daily actions and possessions to the evanescent sphere of "cloud computing." He claims: "Any immaterial civilization will be heavily materialized because its immaterial products are necessarily linked to the mechanical infrastructure that generates, stabilizes, and governs them" (Moles 1988, 30). Moles qualifies such a material infrastructure "spectacular," above all, for its sheer complexity: "A 3cm² microprocessor comprises more 'things' than an automobile—more components, more functions, more connections, more relays, and, conceivably, more raw intelligence" (1988, 26).

---

conditioned by the way in which the production and consumption of goods are manifested in a given society. In other words, it is necessary to admit that industrial design, contrarily to what had imagined its precursors, is not an autonomous activity. Although its choices might seem to be free, and maybe sometimes they are, these choices are always made in the context of a system of considerably rigid pre-established priorities. Ultimately, it is this system of priorities that regulates industrial design" (Maldonado 1991, 14, my translation from Portuguese).

51. See Diani (1988).

In Moles' understanding, the material infrastructure of post-industrial times was just minimally organized, and the role of design was to provide adequate "maintenance" in order to ensure its "reliable" manifestation for users (1988, 26–27). In doing so, human subjects would not lose contact with reality by substituting what are the "real objects" for their "appearances" (Moles 1988, 25). In other words, designers had to mind the "individual's connection with the material support underlying the new culture of immateriality" (1988, 30), however essentially tenuous and prone to disarrangements Moles believed this connection to be.

Turning to the workplace of designers, Moles argued that a comparable challenge came from the recent introduction of computer technologies. For him, by moving from the direct manipulation of materials to interactions primarily based on "immaterial techniques," i.e., "artificial representations, images, and diagrams composed by image-generating machines" (Moles 1988, 28), designers were endangered of losing mastery over their material productions, handing off to computer automation control over what was once accomplished by themselves:

> ...one expects no longer to find drafting tables, sculptor's tools or carpenter's chisels in the design room. They are being phased out by drawing and image-creating machines that yield computer graphics, so that the material objects themselves, as products of these images or of audio and visual simulations, are, at a distance, mere products of the imagination, and seem more *credible* than *real* (Moles 1988, 29).

While Moles was premonitory in observing the massive technological infrastructure that must underline any service society, in hindsight, his concerns about the fleeting materiality in the design studio are less troubling today than they might have been right after the widespread use of computers. Within a decade after his article, we see a more positive valuation of computer technologies emerging, where the digital medium is acknowledged as possessing genuine qualities for industrial designers and as promoting the specialization in a new culture of handicraft (McCullough 1996). Furthermore, recent ethnographic studies of engineering work confirmed that changes caused by handling computer-

generated visualizations do not annul designers' grasp on materiality (e.g., Henderson 1999; Vinck 2003).

The point is that, with novel materials to work with, design will adapt and change. Considering the distinct materiality of service interfaces, including human techniques, design is now in a position to reflect on and incorporate new form-giving expertise. The way is clear for designers to learn from the approaches of other creative professionals with longer traditions in the service sectors. In the end, design might be able to learn from the hairdresser as much as it has from the cabinetmaker.

Bibliography

Anceschi, Giovanni. 1992. “Il dominio dell’interazione: protesi e anafore per il progetto dell’interfaccia.” In *Il progetto delle interfacce: oggetti colloquiali e protesi virtuali*, 7–41. Milano: Domus Academy.

Arai, T., and Y. Shimomura. 2004. “Proposal of Service CAD System: A Tool for Service Engineering.” *CIRP Annals—Manufacturing Technology* 53 (1): 397–400.

Berry, Leonard L., and A. Parasuraman. 1991. *Marketing Services: Competing through Quality*. New York: The Free Press.

Bitner, Mary Jo. 1993. “Managing the Evidence of Service.” In *The Service Quality Handbook*, ed. Eberhard E. Scheuing and William F. Christopher, 358–370. New York: AMACOM.

Blomkvist, Johan. 2011. “Conceptualising Prototypes in Service Design”. PhD thesis, Linköping: Linköping University.

Blomkvist, Johan, and Stefan Holmlid. 2011. “Existing Prototyping Perspectives: Considerations for Service Design.” In *Proceedings of the NorDes Conference 2011*. Helsinki.

Blomkvist, Johan, Stefan Holmlid, and Fabian Segelström. 2011. “Service Design Research: Yesterday, Today and Tomorrow.” In *This Is Service Design Thinking: Basics–Tools–Cases*, ed. Marc Stickdorn and Jakob Schneider, 308–315. Amsterdam: BIS Publishers.

Bonsiepe, Gui. 1999. *Interface: An Approach to Design*. Maastricht: Jan van Eyck Akademie.

———. 2011. *Design, cultura e sociedade*. São Paulo: Blucher.

Booms, Bernard H., and Mary J. Bitner. 1981. “Marketing Strategies and Organization Structures for Service Firms.” In *Marketing of Services*, ed. James H. Donnelly and William R. George, 47–51. Chicago: American Marketing Association.

Carlsson, Hugo Valdivia. 2004. “La racionalidad en la obra de Gui Bonsiepe.” Master of Advanced Studies thesis, Barcelona: Universidad de Barcelona.

Chase, R. B. 1978. “Where Does the Customer Fit in a Service Operation?” *Harvard Business Review* 56 (6): 137–142.

Cipolla, Carla M. 2005. “Tourist or Guest: Designing Tourism Experiences or Hospitality Relations?” In *Design Philosophy Papers: Collection Two*. Ravensbourne, Australia: Team D/E/S.

Cipolla, Carla, and Ezio Manzini. 2009. “Relational Services.” *Knowledge, Technology & Policy* 22 (1): 45–50.

Clark, Graham, Robert Johnston, and Michael Shulver. 1999. “Exploiting the Service Concept for Service Design and Development.” In *New Service Development: Creating Memorable Experiences*, ed. James A. Fitzsimmons and Mona J. Fitzsimmons, 71–91. Thousand Oaks: Sage Publications, Inc.

Clatworthy, Simon. 2011. “Service Innovation through Touch-Points: Development of an Innovation Toolkit for the First Stages of New Service Development.” *International Journal of Design* 5 (2): 15–28.

Cottam, Hilary, and Charles Leadbeater. 2004. *RED Paper 01: Health: Co-Creating Services*. London: Design Council.

Diana, Chiara, Elena Pacenti, and Roberta Tassi. 2009. "Visualtiles: Communication Tools for (Service) Design." In *Proceedings of the ServDes. Conference 2009*, 2–12. Oslo.

Diani, Marco, ed. 1988. "Designing the Immaterial Society." *Special Double Issue, Design Issues* 4 (1-2).

Dourish, Paul. 2001. *Where the Action Is: The Foundations of Embodied Interaction*. Cambridge: MIT Press.

Edvardsson, Bo. 1995. "The Role of Service Design in Achieving Quality." In *The Service Quality Handbook*, ed. Eberhard E. Scheuing and Christopher, William F., 331–346. New York: AMACOM.

———. 1997. "Quality in New Service Development: Key Concepts and a Frame of Reference." *International Journal of Production Economics* 52 (1-2): 31–46.

Edvardsson, Bo, Anders Gustafsson, Michael D. Johnson, and Bodil Sandén. 2000. *New Service Development and Innovation in the New Economy*. Lund, Sweden: Studentlitteratur.

Edvardsson, Bo, Anders Gustafsson, and Inger Roos. 2005. "Service Portraits in Service Research: A Critical Review." *International Journal of Service Industry Management* 16 (1): 107 – 121.

Edvardsson, Bo, and Jan Olsson. 1996. "Key Concepts for New Service Development." *The Service Industries Journal* 16 (2): 140–164.

Ehn, Pelle. 1988. *Work-oriented Design of Computer Artifacts*. Stockholm: Arbetslivscentrum.

Evenson, Shelley. 2008. "A Designer's View of SSME." In *Service Science, Management and Engineering: Education for the 21st Century*, ed. Bill Hefley and Wendy Murphy, 25–30. Service Science: Research and Innovations in the Service Economy. New York: Springer Science+Business Media.

Fallan, Kjetil. 2010. *Design History: Understanding Theory and Method*. New York: Berg.

Fällman, Daniel. 2003. "In Romance with the Materials of Mobile Interaction: A Phenomenological Approach to the Design of Mobile Information Technology." Doctoral Thesis, Umea University, Sweden: Larsson & Co:s Tryckeri.

Fathers, James. 2003. "Peripheral Vision: An Interview with Gui Bonsiepe Charting a Lifetime of Commitment to Design Empowerment." *Design Issues* 19 (4): 44–56.

Feenberg, Andrew. 2006. "Active and Passive Bodies: Don Ihde's Phenomenology of the Body." In *Postphenomenology: A Critical Companion to Ihde*, ed. Evan Selinger, 189–196. SUNY Series in the Philosophy of the Social Sciences. Albany: State University of New York Press.

Fisk, Raymond P., Stephen W. Brown, and Mary Jo Bitner. 1993. "Tracking the Evolution of the Services Marketing Literature." *Journal of Retailing* 69 (1): 61–103.

Fitzsimmons, James A., and R. S. Sullivan. 1982. *Service Operations Management*. New York, NY: McGraw-Hill.

Gadrey, Jean. 2000. "The Characterization of Goods and Services: An Alternative Approach." *Review of Income and Wealth* 46 (3): 369–387.

Gallouj, Faiz. 2002. *Innovation in the Service Economy: The New Wealth of Nations*. Cheltenham: Edward Elgar Publishing.

Gallouj, Faïz, and Maria Savona. 2008. "Innovation in Services: A Review of the Debate and a Research Agenda." *Journal of Evolutionary Economics* 19 (2): 149–172.

Gallouj, Faïz, and Olivier Weinstein. 1997. "Innovation in Services." *Research Policy* 26: 537–556.

Ganz, W., and T. Meiren, eds. 2002. *Service Research Today and Tomorrow: Spotlight on International Activities*. Stuttgart: Fraunhofer Institute for Industrial Engineering.

Goldstein, Susan Meyer, Robert Johnston, JoAnn Duffy, and Jay Rao. 2002. "The Service Concept: The Missing Link in Service Design Research?" *Journal of Operations Management* 20 (2): 121–134.

Grönroos, Christian. 1990. *Service Management and Marketing: Managing the Moments of Truth in Service Competition*. Lexington, MA: Lexington Books.

Gummesson, Evert. 1994. "Service Management: An Evaluation and the Future." *International Journal of Service Industry Management* 5 (1): 77–96.

Hasse, Cathrine. 2008. "Postphenomenology: Learning Cultural Perception in Science." *Human Studies* 31 (1): 43–61.

Henderson, Kathryn. 1999. *On Line and On Paper: Visual Representations, Visual Culture, and Computer Graphics in Design Engineering*. Cambridge: The MIT Press.

Hill, Peter. 1999. "Tangibles, Intangibles and Services: A New Taxonomy for the Classification of Output." *The Canadian Journal of Economics / Revue Canadienne d'Economique* 32 (2): 426–446.

Hollins, Gillian, and Bill Hollins. 1991. *Total Design: Managing the Design Process in the Service Sector*. London: Pitman.

Holmlid, Stefan. 2007. "Interaction Design and Service Design: Expanding a Comparison of Design Disciplines." In *Proceedings of the NorDes Conference 2007*, 1–8. Stockholm.

———. 2009. "Participative, Co-Operative, Emancipatory: From Participatory Design to Service Design." In *Proceedings of the ServDes. Conference 2009*, 1–14. Oslo.

Holmlid, Stefan, and Shelley Evenson. 2008. "Bringing Service Design to Service Sciences, Management and Engineering." In *Service Science, Management and Engineering: Education for the 21st Century*, ed. Bill Hefley and Wendy Murphy, 341–345. Service Science: Research and Innovations in the Service Economy. New York: Springer Science+Business Media.

IfM, and IBM. 2007. "Succeeding Through Service Innovation: A Discussion Paper." In Cambridge, United Kingdom: University of Cambridge Institute for Manufacturing.

Ihde, Don. 1979. *Technics and Praxis*. Boston Studies in the Philosophy of Science. Dordrecht: Reidel.

———. 1983. *Existential Technics*. SUNY Series in Philosophy. Albany: State University of New York Press.

———. 1986a. *Experimental Phenomenology: An Introduction*. Albany: State University of New York Press.

———. 1986b. *Consequences of Phenomenology*. Albany: State University of New York Press.

———. 1990. *Technology and the Lifeworld: From Garden to Earth*. The Indiana Series in the Philosophy of Technology. Bloomington: Indiana University Press.
———. 1991. *Instrumental Realism: The Interface Between Philosophy of Science and Philosophy of Technology*. The Indiana Series in the Philosophy of Technology. Bloomington: Indiana University Press.
———. 1998. *Expanding Hermeneutics: Visualism in Science*. Northwestern University Studies in Phenomenology & Existential Philosophy. Evanston, IL: Northwestern University Press.
———. 2002. *Bodies in Technology*. Electronic Mediations Series. Minneapolis: University of Minnesota Press.
———. 2006. "Forty Years in the Wilderness." In , ed. Evan Selinger, 267–290. Albany: State University of New York Press.
———. 2008. *Ironic Technics*. Automatic Press/VIP.
———. 2009a. *Postphenomenology and Technoscience: The Peking University Lectures*. SUNY Series in the Philosophy of the Social Sciences. Albany: State University of New York Press.
———. 2009b. "From Da Vinci to CAD and Beyond." *Synthese* 168 (3): 453–467.
———. 2010a. *Heidegger's Technologies: Postphenomenological Perspectives*. Perspectives in Continental Philosophy. New York: Fordham University Press.
———. 2010b. *Embodied Technics*. Automatic Press/VIP.
———. 2011. "Postphenomenological Re-embodiment." *Foundations of Science* 17 (4): 373-377.
———. 2012. *Experimental Phenomenology: Multistabilities*. Second ed. Albany: State University of New York Press.
Jégou, François, and Ezio Manzini, eds. 2008. *Collaborative Services: Social Innovation and Design for Sustainability*. Milano: Edizioni POLI.design.
Kaner, Maya, and Reuven Karni. 2007. "Design of Service Systems Using a Knowledge-based Approach." *Knowledge and Process Management* 14 (4): 260–274.
Kimbell, Lucy. 2011. "Designing for Service as One Way of Designing Services." *International Journal of Design* 5 (2): 41–52.
Lacroix, Joyca, Privender Saini, and Annelies Goris. 2009. "Understanding User Cognitions to Guide the Tailoring of Persuasive Technology-based Physical Activity Interventions." In *Proceedings of the 4th International Conference on Persuasive Technology*. Persuasive '09. New York, NY, USA: ACM.
Langeard, E., J. E. G. Bateson, C. H. Lovelock, and P. Eiglier. 1981. *Services Marketing: New Insights from Consumers and Managers*. Vol. 81. Cambridge, MA: Marketing Science Institute.
Lehtinen, J. R. 1986. *Quality Oriented Services Marketing*. Tampere, FI: Tampereen Yliopisto.
Leon, Ethel. 2005. *Design brasileiro: quem fez, quem faz*. Rio de Janeiro: Viana e Mosley.
Lovelock, Christopher, and Evert Gummesson. 2004. "Whither Services Marketing? In Search of a New Paradigm and Fresh Perspectives." *Journal of Service Research* 7 (1): 20–41.
Lovelock, Christopher H. 1992. "A Basic Toolkit for Service Managers." In *Managing Services: Marketing, Operations, and Human Resources*, ed. Christopher H. Lovelock, 17–30. 2nd ed. Englewood Cliffs, NJ: Prentice-Hall International.

Lovelock, Christopher, and Jochen Wirtz. 2006. *Services Marketing: People, Technology, Strategy*. 6th ed. Upper Saddle River, NJ: Pearson/Prentice Hall.

Lovelock, Christopher, and Lauren Wright. 1999. *Principles of Service Marketing and Management*. Upper Saddle River, NJ: Prentice Hall.

Ma, Qinhai, Mitchell M. Tseng, and Benjamin Yen. 2002. "A Generic Model and Design Representation Technique of Service Products." *Technovation* 22 (1): 15–39.

Maffei, Stefano, Birgit Mager, and Daniela Sangiorgi. 2005. "Innovation Through Service Design. From Research and Theory to a Network Perspective. A Users' Driven Perspective." In *Proceedings of the Joining Forces Conference*, 1–9. Helsinki.

Maffei, Stefano, Nicola Morelli, Elena Pacenti, and Daniela Sangiorgi. 2005. "The Introduction of Service Design Within Industrial Design Curricula: Comparison of Three Design Approaches and Educational Experiences." In *Design Education, Tradition & Modernity: Scholastic Papers from the International Conference*, 56–66. Ahmedabad: National Institute of Design.

Maffei, Stefano, and Daniela Sangiorgi. 2006. "From Communicational Design to Activity Theory." In *Designing Effective Communications: Creating Contexts for Clarity and Meaning*, ed. Jorge Frascara, 83–100. New York: Allworth Press.

Mager, Birgit. 2004. *Service Design: A Review*. Cologne: Köln International School of Design.

———. 2008. "Service Design." In *Design Dictionary: Perspectives on Design Terminology*, ed. Michael Erlhoff and Tim Marshall, 354–357. Basel: Birkhäuser.

Mager, Birgit, and Shelley Evenson. 2008. "Art of Service: Drawing the Arts to Inform Service Design and Specification." In *Service Science, Management and Engineering: Education for the 21st Century*, ed. Bill Hefley and Wendy Murphy, 75–76. Service Science: Research and Innovations in the Service Economy. New York: Springer Science+Business Media.

Mager, Birgit, and Tung-Jung David Sung, eds. 2011. "Special Issue on Designing for Services." *International Journal of Design* 5 (2).

Maldonado, Tomás. 1991. *Design industrial*. Arte & Comunicação. Edições 70.

Margolin, Victor. 2007. "Design for Development: Towards a History." *Design Studies* 28 (2): 111–115.

Marzano, Stefano, L. 1992. "Prefazione." In *Il progetto delle interfacce: oggetti colloquiali e protesi virtuali*, ed. Giovanni Anceschi, VII–X. Milano: Domus Academy.

McCullough, Malcolm. 1996. *Abstracting Craft: The Practiced Digital Hand*. Cambridge: The MIT Press.

Meroni, Anna, and Daniela Sangiorgi. 2011. *Design for Services*. Design for Social Responsibility. Aldershot: Gower.

Moggridge, Bill. 2007. *Designing Interactions*. Cambridge, MA: MIT Press.

Moles, Abraham A. 1988. "Design and Immateriality: What of It in a Post Industrial Society?" *Design Issues* 4 (1/2): 25–32.

Montefusco, Pietro. 1992. "Interazione, non interfacce." In *Il progetto delle interfacce: oggetti colloquiali e protesi virtuali*, ed. Giovanni Anceschi, 97–131. Milano: Domus Academy.

Morelli, N. 2003. “Product-Service Systems, a Perspective Shift for Designers: A Case Study: The Design of a Telecentre.” *Design Studies* 24 (1): 73–99.

Morelli, Nicola. 2009. “Beyond the Experience: In Search of an Operative Paradigm for the Industrialisation of Services.” In *Proceedings of the ServDes. Conference 2009*, 1–14. Oslo.

Moritz, Stefan. 2005. “Service Design: Practical Access to an Evolving Field”. London: University of Applied Sciences Cologne.

Normann, Richard. 2001. *Service Management: Strategy and Leadership in Service Business*. 3rd ed. Chichester, NY: Wiley.

Ostrom, Amy L., Mary Jo Bitner, Stephen W. Brown, Kevin A. Burkhard, Michael Goul, Vicki Smith-Daniels, Haluk Demirkan, and Elliot Rabinovich. 2010. “Moving Forward and Making a Difference: Research Priorities for the Science of Service.” *Journal of Service Research* 13 (1): 4–36.

Pacenti, Elena. 2004. “Design dei servizi.” In *Design multiverso: appunti di fenomenologia del design*, ed. Paola Bertola and Ezio Manzini, 151–164. Milano: Edizioni POLI.design.

Pacenti, Elena, and Daniela Sangiorgi. 2010. “Service Design Research Pioneers: An Overview of Service Design Research Developed in Italy Since the ‘90s.” *Design Research Journal* 1 (10): 26–33.

Papastathopoulou, Paulina, and Erik Jan Hultink. 2012. “New Service Development: An Analysis of 27 Years of Research.” *Journal of Product Innovation Management* 29 (5): 705–714.

Parker, Sophia, and Joe Heapy. 2006. *The Journey to the Interface: How Public Service Design Can Connect Users to Reform*. London: Demos.

Patricio, Lia, Raymond P. Fisk, and João Falcão e Cunha. 2008. “Designing Multi-Interface Service Experiences: The Service Experience Blueprint.” *Journal of Service Research* 10 (4): 318–334.

Penin, Lara, and Cameron Tonkinwise. 2009. “The Politics and Theatre of Service Design.” In *IASDR 2009 Proceedings*, 4327–4338. Seoul: Korean Society of Design Science.

Philips. 2008. “Vision 2010: Building the Leading Brand in Health and Well-Being”. Philips Corporate Communications.

Pinhanez, Claudio. 2009a. “Services as Customer-intensive Systems.” *Design Issues* 25 (2): 3–13.

———. 2009b. “‘Humans Inside’ as the Key Characteristic of Service Systems.” In *Proceedings of QUIS 11*, 1–10. Wolfsburg.

De Preester, Helena. 2010. “Technology and the Body: The (Im)Possibilities of Re-Embodiment.” *Foundations of Science* 16 (2-3): 119–137.

Pullman, Madeleine E., and Michael A. Gross. 2004. “Ability of Experience Design Elements to Elicit Emotions and Loyalty Behaviors.” *Decision Sciences* 35 (3): 551–578.

Qiu, Robin G. 2009. “Computational Thinking of Service Systems: Dynamics and Adaptiveness Modeling.” *Service Science* 1 (1): 42–55.

Ramaswamy, Rohit. 1996. *Design and Management of Service Processes: Keeping Customers for Life*. Reading, MA: Addison-Wesley.

Riis, Søren. 2011. “Dwelling In-Between Walls: The Architectural Surround.” *Foundations of Science* 16 (2-3): 285–301.

Rosenberger, Robert. 2008. “Perceiving Other Planets: Bodily Experience, Interpretation, and the Mars Orbiter Camera.” *Human Studies* 31 (1): 63–75.
———. 2011. “A Case Study in the Applied Philosophy of Imaging: The Synaptic Vesicle Debate.” *Science, Technology & Human Values* 36 (1): 6–32.
———. 2012. “Mediating Mars: Perceptual Experience and Scientific Imaging Technologies.” *Foundations of Science*: 1–17.
Saco, Roberto M., and Alexis P. Goncalvez. 2008. “Service Design: An Appraisal.” *Design Management Review* 19 (1): 10–19.
Sampson, Scott E., and Craig M. Froehle. 2006. “Foundations and Implications of a Proposed Unified Services Theory.” *Production and Operations Management* 15 (2): 329–343.
Sangiorgi, Daniela. 2004. “Design dei servizi come design dei sistemi di attività: la teoria dell’attività applicata alla progettazione dei servizi.” PhD thesis, Milano: Politecnico di Milano.
———. 2009. “Building Up a Framework for Service Design Research.” In *Proceedings of the 8th European Academy of Design International Conference*, 415–420. Aberdeen.
———. 2011. “Transformative Services and Transformation Design.” *International Journal of Design* 5 (2): 29–40.
Sasser, W. Earl, R. Paul Olsen, and D. Daryl Wyckoff. 1978. *Management of Service Operations: Text, Cases, and Readings*. Boston: Allyn and Bacon.
Scharff, Robert. 2006. “Ihde’s Albatross: Sticking to a ‘Phenomenology’ of Technoscientific Experience.” In *Postphenomenology: A Critical Companion to Ihde*, ed. Evan Selinger, 131–144. Albany: State University of New York Press.
Secomandi, Fernando. 2012. “Thinking through the Service Interface: A Study of Philips DirectLife.” *Design Philosophy Papers* 3/2012.
Secomandi, Fernando, and Dirk Snelders. 2011. “The Object of Service Design.” *Design Issues* 27 (3): 20–34.
———. 2013. “Interface Design in Services: A Postphenomenological Approach.” *Design Issues* 29 (1): 3–13.
Segelström, Fabian. 2010. “Visualisations in Service Design.” PhD thesis, Linköping: Linköping University.
Selinger, Evan. 2006. “Introduction.” In *Postphenomenology: A Critical Companion to Ihde*, 5–6. Albany: State University of New York Press.
Shostack, G. Lynn. 1977. “Breaking Free from Product Marketing.” *Journal of Marketing* 41 (2): 73–80.
———. 1982. “How to Design a Service.” *European Journal of Marketing* 16 (1): 49–63.
———. 1984. “Designing Services That Deliver.” *Harvard Business Review* 62 (1): 133–139.
———. 1987. “Service Positioning through Structural Change.” *Journal of Marketing* 51 (1): 34–43.
Singleton, Benedict. 2009. “Services Design in New Territories.” In *IASDR 2009 Proceedings*, 4305–4315. Seoul: Korean Society of Design Science.
Stickdorn, Marc, and Jakob Schneider, eds. 2011. *This Is Service Design Thinking: Basics–Tools–Cases*. Amsterdam: BIS Publishers.
Stigliani, Ileana, and Anne-Laure Fayard. 2010. *Designing New Customer Experiences: A Study of Socio-Material Practices in Service Design*. London: Imperial College Business School.

Vargo, Stephen L., and Robert F. Lusch. 2004a. “Evolving to a New Dominant Logic for Marketing.” *Journal of Marketing* 68 (1): 1–17.
———. 2004b. “The Four Service Marketing Myths Remnants of a Goods-Based, Manufacturing Model.” *Journal of Service Research* 6 (4): 324–335.
Verbeek, Peter-Paul. 2005. *What Things Do: Philosophical Reflections on Technology, Agency, and Design*. University Park, PA: The Pennsylvania State University Press.
———. 2008. “Cyborg Intentionality: Rethinking the Phenomenology of Human–Technology Relations.” *Phenomenology and the Cognitive Sciences* 7 (3): 387–395.
———. 2011. *Moralizing Technology: Understanding and Designing the Morality of Things*. Chicago: University of Chicago Press.
Vinck, Dominique, ed. 2003. *Everyday Engineering: An Ethnography of Design and Innovation*. Cambridge: The MIT Press.
de Vries, Erik J. 2006. “Innovation in Services in Networks of Organizations and in the Distribution of Services.” *Research Policy* 35 (7): 1037–1051.
Welton, Donn. 2006. “Body and Machines.” In *Postphenomenology: A Critical Companion to Ihde*, ed. Evan Selinger, 197–209. Albany: State University of New York Press.
Wemmerlöv, Urban. 1990. “A Taxonomy for Service Processes and Its Implications for System Design.” *International Journal of Service Industry Management* 1 (3): 20–40.
Wetter Edman, Katarina. 2011. “Service Design: A Conceptualization of an Emerging Practice.” Licentiate Thesis, Gothenburg: University of Gothenburg.
Windrum, Paul, and Manuel García-Goñi. 2008. “A Neo-Schumpeterian Model of Health Services Innovation.” *Research Policy* 37 (4): 649–672.
Winograd, Terry, and Fernando Flores. 1986. *Understanding Computers and Cognition: A New Foundation for Design*. Norwood: Ablex Publishing Company.
Zeithaml, Valarie A., A. Parasuraman, and Leonard L. Berry. 1985. “Problems and Strategies in Services Marketing.” *Journal of Marketing* 49 (2): 33–46.
———. 1990. *Delivering Quality Service*. New York: The Free Press.
Zomerdijk, Leonieke G., and Christopher A. Voss. 2010. “Service Design for Experience-centric Services.” *Journal of Service Research* 13 (1): 67–82.

Summary

One of the fundamental questions facing the emerging discipline of service design concerns the definition of its object. In this thesis, I posit that the practice of service design, as a recent development within the tradition of industrial design, may be approached primarily as the design of interfaces between service providers and clients. In chapter 1, on basis of a critical study of the service literature spanning the disciplines of management, engineering, and economics, I argue for the importance of acknowledging the materiality of interfaces when designing services. In chapter 2, I comment on relevant views in the field of industrial design about the design of (service) interfaces. Then, drawing on postphenomenological studies in the philosophy of technology, I articulate an approach to service interfaces that stresses the mediating role of materiality in client-provider relations. Chapters 3 and 4 present empirical studies of a service, called DirectLife, where digital technology plays such a mediating role. This service, which was developed and commercialized by Philips, is intended to help people become more physically active. In chapter 3, I elaborate on the user experience of DirectLife from a postphenomenological perspective, describing how its material interface transforms clients' perceptions of their bodies and social selves. In chapter 4, turning to the provider's perspective, I analyze the multiple visualizations generated and interpreted by the designers of DirectLife in the process of materializing a new service interface. Chapter 5 seeks to extend this postphenomenological perspective on service design beyond the scope of client-provider interactions that are mediated mainly by digital technologies. Drawing on an empirical study of a design project carried out at the Service Science Factory, I demonstrate how human-to-human interfaces may be understood from a postphenomenological perspective, and I discuss the implications of this for the design of interpersonal services. To conclude, in chapter 6 I propose that contributions of this thesis may serve to deepen the debate about the distinction between products and services and to invite designers to rethink their expertise in postindustrial times.

Samenvating

Een van de fundamentele vragen die de opkomende discipline van het dienstontwerpen bezighoudt betreft het definiëren van haar onderwerp. In dit proefschrift stel ik dat de praktijk van het dienstontwerpen, als een recente ontwikkeling binnen de traditie van het industrieel ontwerpen, primair benaderd kan worden als het ontwerpen van raakvlakken (interfaces) tussen aanbieders en afnemers van diensten. Gebaseerd op een kritische studie van de 'diensten' literatuur die de disciplines management, techniek en economie omvat, beargumenteer ik in hoofdstuk 1 dat het belangrijk is voor ontwerpers om de materialiteit van deze raakvlakken te onderkennen tijdens het ontwerpen van diensten. In hoofdstuk 2 becommentarieer ik de perspectieven binnen het veld van industrieel ontwerpen die relevant zijn voor het ontwerpen van (dienst-) raakvlakken. Ik maak daarbij gebruik van eerdere postfenomenologische studies uit de filosofie van de technologie en op basis daarvan formuleer ik een benadering voor dienstraakvlakken die uitgaat van een relatie tussen klant en aanbieder waarbij materialiteit een bemiddelende rol speelt. Hoofdstukken 3 en 4 presenteren empirische studies over een dienst waarin technologie een dergelijke bemiddelende rol speelt. Deze is bedoeld om mensen te helpen om fysiek actiever te worden en is ontwikkeld en op de markt gebracht door Philips. In hoofdstuk 3 behandel ik de ervaring van gebruikers van deze dienst vanuit een postfenomenologisch perspectief, en ik beschrijf hoe het raakvlak van de dienst een transformatie teweegbrengt in het lichamelijke en sociale zelfbeeld van klanten. In hoofdstuk 4 schakelen we over naar de ervaringen van de aanbieder van de dienst. Daarbij analyseer ik de vele visualisaties die ontwerpers maakten en aan anderen uitlegden, terwijl ze werkten aan de materiele totstandkoming van een nieuw dienstraakvlak. Hoofdstuk 5 is erop gericht om de voorgestelde postfenomenologische benadering voor dienstontwerpen verder door te denken, tot voorbij de interacties tussen klant en aanbieder waarbij technologische raakvlakken een bemiddelende rol spelen. Op basis van een empirische studie van een

ontwerpproject bij de Service Science Factory, laat ik zien hoe ook 'mens-tot-mens' raakvlakken in diensten beschreven kunnen worden vanuit een postfenomenologisch perspectief en ik behandel daarbij tevens de implicaties voor het ontwerpen van diensten die tussen mensen onderling plaats vinden. Tot slot stel ik in hoofdstuk 6 voor dat de resultaten van dit proefschrift zullen leiden tot een verdieping van het debat over het onderscheid tussen producten en diensten en ik nodig daarbij ontwerpers uit om hun deskundigheid in postindustriële tijden te heroverwegen.

About the Author

Fernando Secomandi was born on June 19, 1980 in Rio de Janeiro, Brazil. He concluded his bachelor studies in Industrial Design in 2003 at the *Escola Superior de Desenho Industrial* of the Rio de Janeiro State University, following an exchange semester at the *Fachhochschule Potsdam*, in Germany. In 2005, after a couple of years practicing design in Brazil, Fernando moved to The Netherlands to pursue his master education in Strategic Product Design at the Delft University of Technology. Being awarded a M.Sc. degree with distinction *cum laude*, in 2008 he was hired by the Faculty of Industrial Design Engineering of that same university to initiate his doctoral studies on the topic of service design. Fernando's Ph.D. research has been published in leading design periodicals, including *Design Issues* and *Design Philosophy Papers*, as well as in the proceedings of several international academic meetings, such as *Design Thinking Research Symposium*, *EGOS Colloquium, 4S Conference*, and *RESER Conference*. He has also lectured or presented his work at design and business schools based in Brazil, Finland, The Netherlands, North America, and United Kingdom.

ISBN 978-90-9027226-9