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# Thinking through the Service Interface

## A Study of Philips DirectLife

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In the recent book *Moralizing Technology: Understanding and Designing the Morality of Things*,<sup>1</sup> Peter-Paul Verbeek argues that ethical theory must overcome the modernist split between the nonhuman and human realms, in order to come on grips with present-day live imbued with technologies. By assimilating ideas from a range of thinkers, including Latour and Foucault, but mainly working from a postphenomenological standpoint evolved from the writings of Ihde,<sup>2</sup> Verbeek provides an account of technological mediation that is meant to evidence the ways in which material artifacts co-shape the moral principles and conducts of people. He supports the analysis with empirical studies in the area of ambient intelligence and persuasive technologies, referring to situations where miniaturized and networking technologies are purposefully designed to influence the behavior of users.

This sketch of Verbeek's argument serves as a prologue to the central question motivating this essay, which is about the design of services. Many of the contemporary applications of technologies that Verbeek discusses in his book breach the envelope of what is traditionally considered

to be industrial goods and enter the domain of services in various settings, of transportation, healthcare, education, etc. Examples 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. In these cases, more than locating users in relation to an intelligent artifact, technologies mediate the interactions between people and a service provider. But do designers count on an adequate framework to understand the mediating role of technologies in services?

The theme of services has attracted great attention in the design sphere in recent years, motivating a number of specialized academic works. This paper draws attention to a line of research associated with what has been named the “interaction paradigm” in service design.<sup>3</sup> The term refers to the widely acknowledged dependence of service designers on concepts, tools, curricula, and other influxes coming from the discipline of interaction design.<sup>4</sup> Within this line of research, the analysis pursued in this text centers on a debate originating in Italy around the design of *service interfaces*. The appropriation of the interface concept as a way to investigate the topic of service design is not surprising, after all, as Pacenti observes,<sup>5</sup> the advent of computer technologies in the last decades has led to dramatic changes in the service sectors, in especial, with regard to the direct involvement of users in the delivery process. However, despite being acknowledged by many as foundational for the discipline of service design,<sup>6</sup> this Italian discussion about the service interface lacks an extended treatment in English and thus remains poorly known by the design community at large.

This paper is intended as an introduction to the aforementioned debate, but framed as a critique of the present conceptualization of the service interface in design research. In the coming section I will start by outlining the Italian discussion on the service interface, with especial attention to Pacenti’s pathbreaking analogy with the field of interaction design and the problems arising from Sangiorgi’s critical revision of that work. Then, in the attempt to contribute to this debate, I present an empirical study of an innovative service called DirectLife on basis of a postphenomenological analysis of the lived experiences of its users. Finally, in the conclusion, I summarize the main insights coming from this investigation and argue that design practitioners need to acknowledge service interfaces as multifaceted materials worthy of mindful deliberation and manipulation.

### **The Service Interface: Design Perspectives**

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.<sup>7</sup> Pacenti’s concludes, after an analysis mainly of the economic and management literatures, that the defining

characteristic of services, and a significant one when approaching them from a design perspective, is that services are produced out of interactions between users and providers. She is particularly inspired by the concept of “service evidence,” coined in marketing by Shostack to denote all material cues used by people to evaluate a process that is organized and rendered for them by a service provider. According to Shostack,<sup>8</sup> managers should carefully manipulate the evidence of services, because “service ‘reality’ is arrived at by the consumer mostly through a process of deduction, based on the total impression that the evidence creates.” Pacenti’s original take on this 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 concludes:

The service can in fact be observed as a complex organizational system or just 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 of the interaction is the organizational structure that is behind.<sup>9</sup>

In weaving together theories about service coproduction and interface design, Pacenti is able to clear some ground for service design to evolve with partial independence from the other design subdisciplines. Still, she maintains 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, Pacenti builds on the earlier approaches to interface design set forth by Anceschi<sup>10</sup> and Montefusco.<sup>11</sup>

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 users. For Anceschi, the interface was therefore the “place of the interaction,”<sup>12</sup> 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.”<sup>13</sup>

Starting with the idea that interactive artifacts involve the actions of users, Montefusco in turn had 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 endorsed the view that designers should

“transcend” the physical materiality of the interface, in order to concentrate on the user behaviors associated with it.<sup>14</sup> 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.<sup>15</sup>

It should be noted at this point that the definitions of Anceschi and Montefusco differ. Anceschi’s “interface” is in principle an *expansive* one, in that it coincides with the domain of interaction including users and technologies. Montefusco, on the other hand, uses the term “interaction” as referring to something similar to Anceschi, and reserves “interface” for specifying the material artifact independently of users. Montefusco’s, thus, is a *narrower* interface. Based on this distinction, Pacenti would settle for an expanded conception of the service interface encompassing users, material artifacts/environments, and human providers. However, by adopting Montefusco’s emphasis on the potential event without minding the ambiguity noted here, her own conception is open to the suggestion that the service interface constitutes a narrowly material domain.<sup>16</sup> As argued below, Pacenti’s take on service design will be undermined by Sangiorgi on similar grounds, although by taking an alternate route.

Following Pacenti’s lead, Sangiorgi is in a position to presume the relevance of an interaction design perspective to services and to expand on it.<sup>17</sup> She does so with a focused study of the management literature on service encounters, followed by detailed readings in the area of activity theory. Sangiorgi forges a theoretical synthesis of these two fields in the form of the service “encounter model.”<sup>18</sup> According to this model, a service is generated in encounters between the activity systems of users, providers, and possibly other stakeholders who coproduce it. On basis of her encounter model, Sangiorgi also extends Pacenti’s work in the direction of more sophisticated design tools and guidelines, venturing into methodological terrains that sit outside the scope of the present analysis.<sup>19</sup>

While Sangiorgi’s views on service design agree with Pacenti’s position in important ways, especially in characterizing services as coproduced in the user-provider interaction, she departs from Pacenti by questioning the centrality of the interface concept. Her position is demonstrated in a text written with Maffei, where the authors describe the service encounter model in an empirical context.<sup>20</sup> 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 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.<sup>21</sup>

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”<sup>22</sup> and that it is the “physical device around which the service space is materialized.”<sup>23</sup> 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.<sup>24</sup>

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).<sup>25</sup>

Against the backdrop of this augmented conception, Sangiorgi concludes that Pacenti's approach to service design is limited to the “one-to-one” (user-interface) encounter, without integrating the sociocultural “world” that embeds the interaction.<sup>26</sup> This position would appear to echo Montefusco's call, referenced above, to transcend the interface's materiality. In effect, it is a line of argumentation that reduces the service interface to an inert, self-contained, asocial material—a limited perspective on services, indeed. This conclusion is not challenged thereafter, and a certain degree of closure ensues around this narrow view on the service interface. In a joint publication by the exponents of this debate, for example, Sangiorgi's work is portrayed as a contribution to widening the object of service design beyond the interface.<sup>27</sup>

Without wanting to oppose the importance of contemplating the sociocultural dimension of service experiences, I hold that designers must not move beyond the materiality of interfaces in order to take account of that. Such a movement presupposes that the interface concept provides a narrowly materialist account of how services are experienced. However, this belief runs counter to Shostack's claim, which Pacenti initially underlined, that from the user perspective a service is *only* actualized 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 users precisely in interaction with interface materials. More than that, designers need to understand that service interfaces help to shape users' sociocultural identities in important ways. For example, when an expatriate receives information from a call center in a language that he does not understand, this is not merely a useless exchange with the service provider; the experience of the interface reinforces that person's misfit in the foreign country. The extant discussions about service design look only superficially into this constitutive aspect of user-interface relations, and the accompanying analyses provide little empirical detail showing the complex ways in which services and people are co-created in interaction.

The next section is meant to advance this discussion about the service interface with an in-depth study of 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 1, foreground), which is a device employing accelerometer technology to estimate human energy expenditure. When properly worn by people 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, this information is then uploaded to a website application where users can monitor their registered activity patterns and follow instructions on how to become more physically active (Figure 1, middle). This website also contains a 12-week activity improvement program that sets progressively higher targets to be reached by users on a weekly basis. In addition to the activity monitor and the website, DirectLife automatically generates a weekly communication with summaries of users' achievements and makes available a human coach for personalized support via e-mail (Figure 1, background).

DirectLife is one of the first consumer-oriented market offerings of Philips technologies after a recent company-wide reorientation of the brand towards the areas of health and well-being.<sup>28</sup> The design of this integrated package is intended to motivate people to achieve long-lasting changes in physical behavior, by relying on a technological system that is partly automated, yet flexible enough to deliver support as efficacious as one-on-one coaching.<sup>29</sup> By these



**Figure 1**

Illustration of the DirectLife service interfaces.

means, the DirectLife service holds the promise of performing “mass interventions” into the currently widespread sedentary lifestyles, helping people to attain healthy levels of daily activity as set by the World Health Organization.<sup>30</sup> Hence, DirectLife is an exemplary case of the persuasive technologies mentioned in the introduction, the ones inviting researchers to think through service design from a user-centered perspective.

The following analysis of DirectLife is framed as a postphenomenological study. Postphenomenology is a perspective within the philosophy of technology pioneered by Ihde that investigates how experiences of the world are mediated by technologies and the effects of that on human self-interpretation.<sup>31</sup> The adoption of a postphenomenological standpoint in this study entails performing an in-depth examination of the users’ embodied experiences with the technological interfaces of DirectLife. Because of its characteristic attention to issues of materiality and embodiment, postphenomenology is a suitable approach for substantiating my revision of the service interface concept as delineated above.

In order to obtain insight into DirectLife, I became a regular user of this service for the whole duration of a 12-week activity improvement program. In addition, 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 users, 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 users 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 their personal opinions in greater depth. These interviews were transcribed verbatim and analyzed together with the weekly feedbacks on the Atlas.ti software.

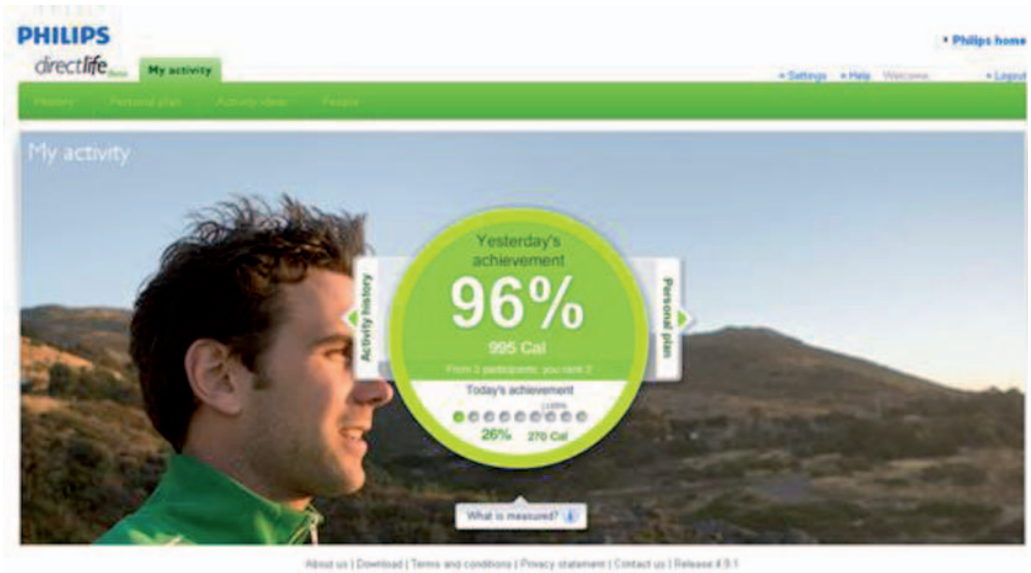
## **Using the DirectLife Service: A Postphenomenological Study**

### ***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, users logon to the website for the first time. This initial analysis highlights the interpretation of the website interface and the users' correlated perception of their situated perspective. From a postphenomenological perspective, DirectLife users and the service interface cannot exist independently of each other; they are *co-constituted* in interaction, as the following analysis demonstrates.<sup>32</sup>

Immediately after launching the Internet browser application, the webpage known as the “dashboard” appears (Figure 2). The green circle dominates the perceptual field against a photographic image and other graphic elements. The illustration below belies the actual focalization of 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 location 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, I empathize with him and vicariously sense the external location, the feeling of action, and the recompense for being physically active.



**Figure 2**  
Screenshot of the DirectLife dashboard interface.

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.

It is already noticeable how the experience of the dashboard webpage reflexively evidences my own bodily position 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.<sup>33</sup> Years of education are necessary for comprehending readings of my 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 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.

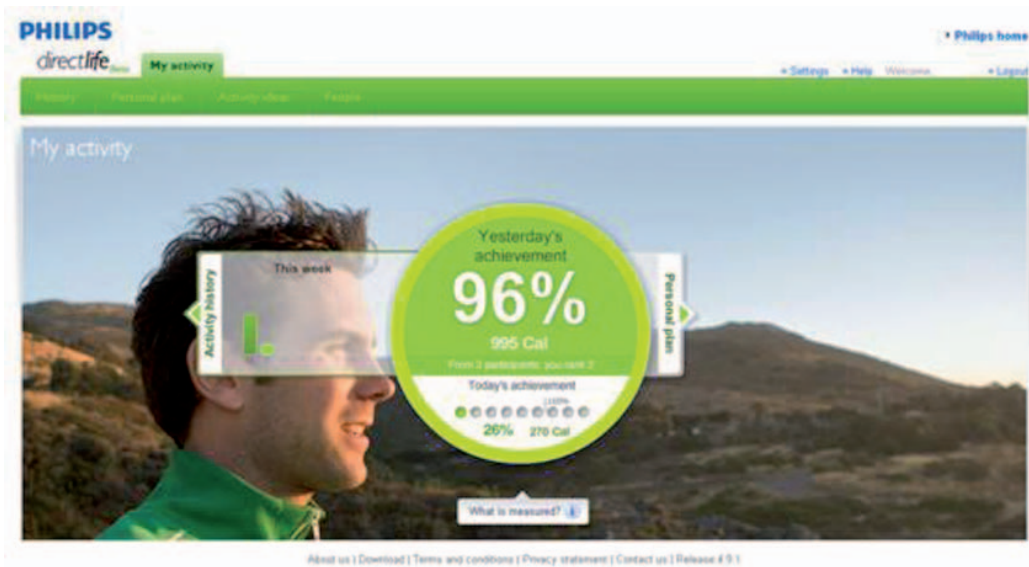
The biggest clue for this “other” that inhabits the service interface is, of course, the Philips and DirectLife logos at the screen’s upper-left corner. The surrogate presence of these organizations through their visual brands confers authenticity and ownership to the webpage. Philips is a reputable innovator in the field of electronics, and they stand behind DirectLife’s communication. Therefore, in principle I trust 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 first; the header

proposes navigation options from left to right 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 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 possible to note how perception 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*.<sup>34</sup> By examining the mediating role of the DirectLife interface, it is possible to describe a complementary domain of experience that is revealed through it, which I call the *service infrastructure*. Continuing with the DirectLife website, I proceed by clicking on the left tab of the dashboard circle (Figure 3). This has become such a routine performance that it really obscures what the action of clicking action 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 me move 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



**Figure 3** Screenshot of the DirectLife dashboard’s activity history tab.

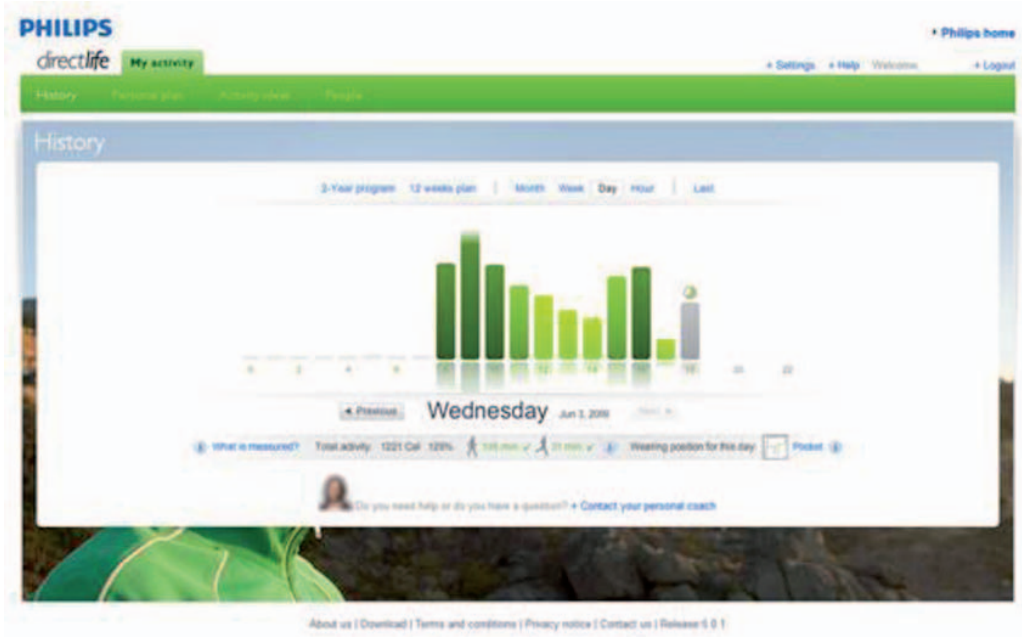
previously acquired eye-hand coordination skills hinging on the learned association between the arrow pointer at the screen and the handheld mouse on the tabletop.

When reaching for that tab, the cursor, the computer screen, my honed skills and learned signs—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 network of cables, routers, modems, data communication protocols, etc.<sup>35</sup> Part of this networking infrastructure exposed in the fraction-of-seconds between screens is controlled by DirectLife. Most of it, however, also gets presented to me when interacting with other service companies, like the telephone and Internet provider. On this occasion, what makes these aspects of the networking infrastructure part of the experience of DirectLife, 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. The service infrastructure has a strictly indirect, yet essential role in generating the complete user experience of interfaces.

### ***The Non-Neutrality of Service Interfaces***

An important contribution of postphenomenological research is to have identified the nuanced ways in which people relate to material artifacts—the so-called human-technology relations.<sup>36</sup> The following description is of a *hermeneutic* relation, which is the case where humans rely on their interpretative capacities to “read” through technologies some aspect of the world.<sup>37</sup> The analysis centers on the history view webpage, which provides users access to their recorded levels of bodily activity by means of an interactive visualization (Figure 4).<sup>38</sup> 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. While the analysis thus far has been based on my personal experiences as a user,<sup>39</sup> I now take into account the opinions of other participants of the usability study.



**Figure 4**  
Screenshot of the DirectLife history view interface.

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 participation 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 this 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 representing memories of active and inactive behaviors, for it can also produce novel occurrences in someone’s life. As long as users uninterruptedly carry the activity monitor, the history view will display measurements associated with

every single activity, even those that might have passed unremarked. Even just walking somewhere becomes an explicit action that can contribute more or less to an 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 users 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.<sup>40</sup> The history view interface makes users' bodily behavior better demarcated, measurable, and accountable for. This transformation is one of the powerful features of DirectLife influencing users to adopt more active behaviors. To conclude that the history view determines users' experiences of their bodily condition, however, would mean to overlook their active participation in the program and deliberate choices made. The next section covers some of the negotiations taking place between DirectLife interfaces and users in the process of co-creating healthier bodies.

### ***The Accommodations between Clients and Service Interfaces***

One reason why DirectLife users do not settle immediately with the version of their bodies depicted by the history view is that such visualizations are rarely 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, if 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 are made in the 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 through the history view interface, DirectLife clients must therefore learn to conceive of their bodies as a hybrid entity: partly own body, partly activity monitor. The "incorporation" of technologies as extensions of one's bodily capacities is commonly treated in postphenomenology as a relation of *embodiment*.<sup>41</sup> Having stated that, when actually using the activity monitor, participants apparently engaged 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.<sup>42</sup> Some users of DirectLife described their use 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 users' 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 carrying 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.<sup>43</sup>

The majority of DirectLife users start the program in a sedentary condition, which means that their foremost objective is to reach the 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 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. Moreover, 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 approached 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 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 users' social relations.

### ***The Impact of Service Interfaces on the Social Self***

Registration in the DirectLife program does not normally go unnoticed to users' 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 deliberately taking any action to improve physical behavior. When the ambition is to really become more active, even minute behavior changes can significantly affect the social identities of users. 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* human-technology relation, whereby users have the experience of communicating with another human being "through" the text that is written and read onscreen.<sup>44</sup> Via this service interface, 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 10<sup>th</sup> 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 an 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 towards 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 users' 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 could display a more expendable relation towards 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 impact of DirectLife on the health condition of its users. 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 their 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 study of DirectLife allows me to return to the theme of the mediating role of technology in services, in particular, technologies that establish an interface between providers and end-users. In the earlier parts of this paper, 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 DirectLife interfaces, users rely on their own 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 predispositions when reacting to nudges to alter their bodily behavior. In following the program, users are challenged to experiment with new social identities that are attributed to themselves and other actors, including service providers and friends. It is correct, then, to claim that there is a sociocultural "world" embedding the experience

of services. However, from the embodied perspective of users this world is only realized as a service dimension in interaction with the material interface.

Users of a technology-enabled service like DirectLife cannot escape the interface. They may shift attention to other aspects of their environment, but as long as they use the service, they must relate to one of its 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 a person's body as healthy or sedentary. Whether this experience will motivate crowds to adopt more active lifestyles or simply aggravate obesity complexes, depends in part on how carefully designers manipulate the service interface.

By focusing away from the interface, the tendency is to misconstrue how people's lives are actually being shaped by technologies. One of the risks with that is to overlook the expertise that is required of service designers. In order to devise valuable service interfaces, designers can already contribute much knowledge accumulated in the disciplines of product, graphic, interaction design, among others. But they should also develop special competencies by learning from other service-oriented professionals and their ways of dealing with interface matters. In the case of "persuasive" services like DirectLife, these could include occupational therapists, personal trainers, health psychologists, and more. Because no service can exist if not through a material interface, therein lies the true challenge for service designers to help catalyze societal transformations.

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### Notes

1. Peter-Paul Verbeek, *Moralizing Technology: Understanding and Designing the Morality of Things* (Chicago: University of Chicago Press, 2011), 90.
2. See, e.g., Don Ihde, *Technology and the Lifeworld: From Garden to Earth*, The Indiana Series in the Philosophy of Technology (Bloomington: Indiana University Press, 1990).
3. Anna Meroni and Daniela Sangiorgi, *Design for Services, Design for Social Responsibility* (Aldershot: Gower, 2011), 16–17.
4. See, e.g., Stefano Maffei et al., "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* (presented at the International Conference on Design Education: Tradition and Modernity, Ahmedabad: National Institute of Design, 2005), 56–66; Nicola Morelli, “Beyond the Experience: In Search of an Operative Paradigm for the Industrialisation of Services” (presented at the 1st Nordic Conference on Service Design and Service Innovation, Oslo, 2009); Bill Moggridge, *Designing Interactions* (Cambridge, MA: MIT Press, 2007), 383–447; Stefan Holmlid, “Interaction Design and Service Design: Expanding a Comparison of Design Disciplines,” in *Proceedings of the NorDes Conference 2007* (presented at the 2nd Nordic Design Research Conference 2007: Design Inquiries, Stockholm, 2007), 1–8; Birgit Mager, “Service Design,” in *Design Dictionary: Perspectives on Design Terminology*, ed. Michael Erhoff and Tim Marshall (Basel: Birkhäuser, 2008), 354–357; Daniela Sangiorgi, “Building Up a Framework for Service Design Research” (presented at the 8th European Academy of Design International Conference, Aberdeen, 2009), 415–420.

5. Elena Pacenti, “Design Dei Servizi,” in *Design Multiverso: Appunti Di Fenomenologia Del Design*, ed. Paola Bertola and Ezio Manzini (Milano: Edizioni POLI.design, 2004), 151–164.
6. Morelli, “Beyond the Experience: In Search of an Operative Paradigm for the Industrialisation of Services.” Sangiorgi, “Building Up a Framework for Service Design Research.” Benedict Singleton, “Services Design in New Territories,” in *IASDR 2009 Proceedings* (presented at the Design: Rigor & Relevance, Seoul: Korean Society of Design Science, 2009), 4305–4315. For an overview of Italian contributions to service design, see Elena Pacenti and Daniela Sangiorgi, “Service Design Research Pioneers: An Overview of Service Design Research Developed in Italy Since the '90s,” *Design Research Journal* 1, no. 10 (2010): 26–33.
7. The following analysis is based on two published summaries of Pacenti’s doctoral research. See Pacenti, “Design Dei Servizi.”; Pacenti and Sangiorgi, “Service Design Research Pioneers: An Overview of Service Design Research Developed in Italy Since the '90s.”
8. G. Lynn Shostack, “Breaking Free from Product Marketing,” *Journal of Marketing* 41, no. 2 (1977): 78.
9. Pacenti, “Design Dei Servizi,” 158 (my translation from Italian).
10. Giovanni Anceschi, “Il Dominio Dell’interazione: Protesi e Anafore Per Il Progetto Dell’interfaccia,” in *Il Progetto Delle Interfacce: Oggetti Colloquiali e Protesi Virtuali* (Milano: Domus Academy, 1992), 7–41.
11. Pietro Montefusco, “Interazione, Non Interfacce,” in *Il Progetto Delle Interfacce: Oggetti Colloquiali e Protesi Virtuali*, ed. Giovanni Anceschi (Milano: Domus Academy, 1992), 97–131.

12. Anceschi, "Il Dominio Dell'interazione: Protesi e Anafore Per Il Progetto Dell'interfaccia," 40 (my translation from Italian).
13. Pacenti, "Design Dei Servizi," 159 (my translation from Italian).
14. Montefusco, "Interazione, Non Interfacce," 131.
15. Pacenti, "Design Dei Servizi," 160 (my translation from Italian).
16. For Pacenti, the presence of human providers as part of the interface increases the variability in the realization of the "potential event." See Pacenti, "Design Dei Servizi," 161. Others have even questioned whether it is possible to determine an "interface" when the service coproduction is grounded in interpersonal relations. See Carla Cipolla and Ezio Manzini, "Relational Services," *Knowledge, Technology & Policy* 22, no. 1 (2009): 45–50. As the services that are discussed in this paper do not involve providers and users relating "face-to-face," I leave this issue open for later examination.
17. Sangiorgi's PhD thesis, also at the Politecnico di Milano, includes extended commentary on Pacenti's work and was co-supervised by the latter. See Daniela Sangiorgi, "Design Dei Servizi Come Design Dei Sistemi Di Attività: La Teoria Dell'attività Applicata Alla Progettazione Dei Servizi" (PhD thesis, Politecnico di Milano, 2004).
18. *Ibid.*, 83–100.
19. *Ibid.*, 105–233.
20. Stefano Maffei and Daniela Sangiorgi, "From Communicational Design to Activity Theory," in *Designing Effective Communications: Creating Contexts for Clarity and Meaning*, ed. Jorge Frascara (New York: Allworth Press, 2006), 83–100.
21. *Ibid.*, 89.
22. *Ibid.*, 84.
23. *Ibid.*, 90.
24. *Ibid.*, 93.
25. Sangiorgi, "Design Dei Servizi Come Design Dei Sistemi Di Attività: La Teoria Dell'attività Applicata Alla Progettazione Dei Servizi," 3 (my translation from Italian).
26. *Ibid.*, 33.
27. Maffei et al., "The Introduction of Service Design Within Industrial Design Curricula: Comparison of Three Design Approaches and Educational Experiences," 59.
28. Philips, "Vision 2010: Building the Leading Brand in Health and Well-Being" (Philips Corporate Communications, June 2008).
29. Joyca Lacroix, Privender Saini, and Annelies Goris, "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, 2009).
30. *Ibid.*
31. For a brief introduction to Ihde's researches over the past 40 years, see Don Ihde, *Postphenomenology and Technoscience*:

*The Peking University Lectures*, SUNY Series in the Philosophy of the Social Sciences (Albany: State University of New York Press, 2009).

32. A usual way of introducing postphenomenology is to locate it along a stream of thought reacting against a modernist conception of human experience that presupposes a gap between an external objective world and self-contained perceiving subjects. As Ihde has repeatedly argued, key figures of the phenomenological movement undercut this separation by advancing a relational ontology founded on the aprioristic entanglement of human beings and world. See, e.g., Don Ihde, *Consequences of Phenomenology* (Albany: State University of New York Press, 1986), 181–198.
33. Ihde claims: “We are our bodies in the sense in which phenomenology understands our motile, perceptual, and emotive being-in-the-world. But we are also bodies in a social and cultural sense, and we experience that, too.” See Don Ihde, *Bodies in Technology*, Electronic Mediations Series (Minneapolis: University of Minnesota Press, 2002), xi. For a long time Ihde has held that bodily experience is necessarily informed by culture at the very level of sense perception. In a case regarding the use of technologies, for example, Ihde argues that Galileo’ discovery of celestial phenomena through the telescope partly results from culturally-historically sedimented ways of experiencing space and time. See Ihde, *Technology and the Lifeworld: From Garden to Earth*, 42–71.
34. According to Ihde, the seminal phenomenological explorations into the structure of technological mediation were done by Heidegger. Heidegger departed from a Husserlian finding that what appears to consciousness always does so against a background or field, and argued for the existence of a similar figure-ground feature in experiences with material technologies. Thus, he showed through his famous hammer analysis that the technology appears within the context of the hammering action, where it functions as something “in-order-to,” which reveals for the user aspects of a work environment (the nail on the wall, the project at hand, and so forth). For Ihde, what Heidegger had done was to elevate technological use practices to a form of world disclosure, or a way reality is known to humans. See *Technics and Praxis*, Boston Studies in the Philosophy of Science (Dordrecht: Reidel, 1979), 103–129.
35. To some extent, as Ihde once noted, this infrastructure is “invisible” to people and hidden from the embodied experiences of when sitting in front of a networked computer. See Don Ihde, *Embodied Technics* (Automatic Press/VIP, 2010), 81. Rosenberger has also described the experience of “surfing the web” from a postphenomenological perspective, showing that much of our actions of clicking, opening new webpages,

entering passwords, etc., tend to happen “transparently.” But when one encounters a slowly loading webpage, there is a sudden drop of transparency, in the sense that the website, not the actions through the computer, takes the forefront of experiences. See Robert Rosenberger, “The Sudden Experience of the Computer,” *AI & Society* 24, no. 2 (2009): 173–180. Adding to Ihde’s and Rosenberger’s analyses, I note that the networking infrastructure is never completely invisible to users, nor is the personal computer only noticeable when the website malfunctions.

36. Whereas Ihde owes much to Heidegger’s phenomenological analysis of human-technology relations, he has also gone at great lengths at reworking this influence in new directions. A widely acknowledged contribution of his is to have identified four different types of relations humans can establish with technologies: embodiment, hermeneutic, alterity, and background. See Ihde, *Technology and the Lifeworld: From Garden to Earth*, 72–123.
37. *Ibid.*, 80–97.
38. A later development in Ihde’s writings deserves special attention here. That is the dialectic described by him between the *here-body*—or the multisensory, quasi-primordial experiencing body—and the *image-body*—a partially disembodied, virtual dimension of perception. See Ihde, *Bodies in Technology*, 3–15. To the best of my knowledge, Ihde has not related this newer distinction with his earlier accounts on hermeneutic human-technology relations. Here, the connection is established by identifying the image-body as a virtual dimension of users’ bodies that is depicted by the history view interface.
39. According to Ihde, analysis of one’s own experiences is but one way of doing rigorous phenomenology. Contrary to a common misconception about this inquiry style, Ihde holds that phenomenological investigations are not “introspective” and do not entertain the “myth of the given.” Its precept is to start with what is immediately evident to perception as an index for probing into the depths of meaning of phenomena. Ultimately, for phenomenology all knowledge is essentially “intersubjective” as well as “interobjective.” See Don Ihde, *Experimental Phenomenology: An Introduction* (Albany: State University of New York Press, 1986).
40. A long-held claim of Ihde is that technologies oftentimes transform human experience by augmenting some aspect of the world to experience while simultaneously reducing others. However, Ihde underlines that the transformation performed by technologies is essentially ambiguous, not necessarily good or bad. At best, mediating technologies incline towards certain experiences, but never fully determine them. See Ihde, *Technics and Praxis*, 16–27.



41. Ihde, *Technology and the Lifeworld: From Garden to Earth*, 72–80.
42. Ihde described clothes as a similar 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. Ibid., 108–112.
43. This analysis of a background relation with the activity monitor sheds new light into a controversy in postphenomenological studies. Some researchers state that the embodiment and hermeneutic relations constitute the primary modes of technological mediation. See, e.g., Peter-Paul Verbeek, *What Things Do: Philosophical Reflections on Technology, Agency, and Design* (University Park, PA: The Pennsylvania State University Press, 2005), 123–126. This belief comes in spite of Ihde’s suggestion that the non-neutral influence of technologies from a background position, though subtle, does occur and is similar to the other forms of human-technology relations. See Ihde, *Technology and the Lifeworld: From Garden to Earth*, 112.
44. Ihde had already observed that in virtual writing people relate to someone else on the “other side” of the computer screen. See Ihde, *Embodied Technics*, 81. For Feenberg, online textual exchanges present an opportunity for postphenomenological studies to delve deeper into issues of virtual embodiment. For him, e-mail messages are occasions when people “wear” language online and create their social beings in hermeneutically mediated relations with others. “In the case of mediated communication,” Feenberg writes, “a person and the social context of their presence is delivered in the message.” See Andrew Feenberg, “Active and Passive Bodies: Don Ihde’s Phenomenology of the Body,” in *Postphenomenology: A Critical Companion to Ihde*, ed. Evan Selinger, SUNY Series in the Philosophy of the Social Sciences (Albany: State University of New York Press, 2006), 194.