Beyond a Utility View of Personal Informatics: A Postphenomenological Framework

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Abstract

Quantified self apps and other personal informatics designs
have rapidly grown in popularity through the advent of con-
venient Internet of Things related wearables and improved
sensor technology. The rapid growth has, however, left its
mark on how we study this area as the utility that could be
provided has become the centerpiece of attention. This
appears somewhat contradictory, as personal informatics
technology becomes integrated in life in nuanced ways,
contributing value beyond the instrumental data analysis
role. In this paper, we propose relying on postphenomenol-
ogy as a useful foundation for extending the study of per-
sonal informatics, and provide three concluding implications
intended to guide the discussion of such an extension.

Author Keywords

Personal informatics; quantified self; postphenomenology

ACM Classification Keywords

H.5.m [Information interfaces and presentation (e.g., HCI)]:
Miscellaneous

Introduction

As represented by the quantified self discourse (cf. [1]),
efforts within personal informatics have been focused on
utility. Views such as 'self-knowledge through numbers'
and 'the data-driven life' illustrate a stance where ratio-

nally examined personal data leads to useful insight. However, people do not live as rational data scientists [10], but rather seek meaningful experiences with or without the digital technologies available to them. Calls for a more experience-centered approach to personal informatics are beginning to emerge (cf. [3]), and fit well with previous critique of data and technocentricity (cf. [12]). Considering the broader circumstances of living [5] as well as long-term integration in life [4] can be seen as central challenges for personal informatics. Advancing personal informatics will mean following other areas of research by looking beyond immediate utility towards the broader roles of technology in everyday life. Such an examination will also likely help enable intelligent computing techniques within personal informatics [7].

If we are to understand how personal informatics fits into everyday life and the varying roles it plays there, an examination of human–technology relations reported outside personal informatics is in place. Similar re-examinations of the basic frameworks of understanding have been seminal contributions within human-computer interaction and interaction design (through e.g., embodied interaction [2]), as well as information systems research (through e.g., experiential computing [15]). Both these notions hold postphenomenology in common — which recently has regained further attention [14] — and it will therefore also be the foundation for what we suggest as framing for a *postphenomenological personal informatics* viewpoint. By reframing personal informatics through the lens of postphenomenology, this paper aims to introduce a new perspective for analysis and design. The contribution is an initial one, presented to spark discussion and as a call for future research in this direction. We conclude the paper by presenting three implications to guide such discussion.

Theoretical Framework

Instrumental for this work is the shared postphenomenological core of embodied interaction [2] and experiential computing [15]. We will give a brief overview of this core, using the foundational analysis of Ihde [6], and the vocabulary by Verbeek [13] based thereupon. The postphenomenological approach "makes possible a more careful and thorough investigation of specific technologies. Its vocabulary makes it possible to describe technologies not simply in terms of their functionality but also as mediating the relation between human beings and their world." [13, p. 197] We are in other words seeking to discover the structural features of human–technology relations [6].

From the work by Verbeek [13], two primary perspectives can be observed within postphenomenology: experience and existence. In the experience perspective, focus lies on human perception and interpretation of reality. Meanwhile, in the existence perspective, focus lies on human action and involvement in their world. Both experience and existence are highly situated, meaning that they are co-shaped by the technology contextually embedded and available. As a complement to the two primary perspectives of experience and existence, Verbeek presents a set of associated terms with which to describe the impact of specific technologies. For experience, aspects of perception and interpretation are *amplified* or *reduced* by the technology involved. The result of this is referred to as *transformation*. Similarly, aspects of action and involvement are *invited* or *inhibited*, resulting in a *translation* of existence. Having a well-established set of terms provides a consistent language and core for analysis across different situations. The value of a unified language has a long tradition in technology design to combat the its innate complexity [11], ranging from domain-specific applications in e.g., software engineering [9] and game design [8].

Figure 1 (left, rotated labels):

BACKGROUND — Human — Technology/World — TECHNOLOGICAL TEXTURING

ALTERITY — Human→Technology–(World) — quasi-other

HERMENEUTIC — Human→(Technology–World) — FOCAL TECHNOLOGY RELATION

EMBODIMENT — (Human–Technology)→World — quasi-self

Figure 1: Human–technology relations, based on Ihde [6] and Verbeek [13].

Human–technology relations	Embodiment Hermeneutic Alterity Background	
Perspectives	Experience	Existence
Main concerns	Perception Interpretation	Action Involvement
Forms of implications	Transformation Amplification Reduction	Translation Invitation Inhibition

Table 1: A core vocabulary of postphenomenology.

In order to describe how technology shapes experience and existence, the four basic relations between humans and technology defined by Ihde [6, ch. 5] and further discussed by Verbeek [13] provide a useful foundation (Figure 1). First among these is the *embodiment* relation, where the world is experienced *through* technology. Here, technology withdraws from the attention of the user and joins with the human as one, creating a situation where the technology is perceived by the user as a natural extension of themselves. In Ihde's [6] words, technology thus approximates a 'quasi-self'. Eyeglasses are a canonical example of this, sitting between the bearer (i.e. the user) and the world, not to be directly interacted with but instead enhancing the interaction with the world. Another common example can be found in the act of hammering, where the hammer itself can recede from focus of a handy wielder to act as a natural extension of the person. If technologies fail however (foggy glasses or a broken hammer), the embodiment relation can break down quickly as attention is directed at the failing technology rather than the world that the user intends to interact with.

In the *hermeneutic* relation, technology represents the world and thereby becomes less part of the self than the embodiment case. Technologies with a hermeneutic relation still hold a 'referential transparency', as Ihde puts it, meaning that they facilitate understanding of and action in the world. This yields interactions with technology itself but engagement with the world. A map can be an example of this, as in reading it, the actual image and text of the map is what is perceived, but in doing so, the human agent is mentally engaged with the world being represented.

The *alterity* relation falls at the other end of the continuum, further away from embodiment, representing a quasi-other form of relation to technology where the technology is a clear non-part of both the human agent and the world. In this relation, attention and engagement is with technology itself, or as Ihde says: "[T]he technology may emerge as the foreground and focal quasi-other with which I momentarily engage" [6, p. 107]. The intelligent personal assistants found in modern smartphones (e.g., Apple Siri and Google Now) illustrate this form of relation. These mimic human behavior, using natural language and even mood-cues such as humor, thereby acting as an other (or in agency terms: as a separate agent). Interaction with such an assistant means focusing and engaging with it directly, rather than with the world. Technology does not have to be human-like to take on an alterity relation however. For example, configuring a new piece of software also means placing focus and engagement with technology itself rather than the end goal for why the software is being installed.

Finally, while the embodiment–hermeneutic–alterity continuum describes explicit focal relations to technology, there is also a form of relation that does not fit into this continuum.

This is what Ihde [6] refers to as a *background* relation, where technology recedes from the immediate interaction to instead become part of the world, acting there without becoming part of human focus. An example technology with a background relation to most of us is the central heating system, regulating building temperature without direct human involvement. As long as the heating system acts as it is intended, it does not make up an explicit part of interactions within the building, despite implicitly contributing to each interaction through its temperature management. Such 'technological texturing' or 'absent presence', as Ihde expresses it, can transform human experience in subtle ways, precisely because its non-obvious background relation. Ihde's technology relations [6], together with the Verbeek vocabulary [13], summarized in Table 1, will be used in the next section to illustrate how they may be used to extend the personal informatics discourse.

Framework Application to Personal Informatics

The core view of postphenomenology presented above gives us a way to describe and analyze specific personal informatics systems in terms of their relation to the individual user, and the consequent impact on experience and existence. In this section, this viewpoint is applied to the commonly used example of a running app (see description in the sidebar). We do so to illustrate how such a description and analysis impacts the personal informatics discourse.

Applying a postphenomenological view means examining in detail how the app–runner (i.e. the technology–human) relation varies over the course of active use, and in-between use sessions. Doing so reveals a sequence of focal and background relations spanning the run itself, immediately after the run, and when not running (Figure 2). When starting and stopping, the runner is directly engaged with the app, and as such is in an alterity relation. When running,

engagement and attention is with the world, and the app (with its audio cues) joins the runner in an embodiment relation. During the post-run analysis, we find a hermeneutic relation, as the runner is engaged with the world but is so through interacting with the app's representation of it. When the runner goes on to do other things, the app stays active in the background by examining the data of its users. Upon showing a push notification, the app then draws attention back to itself, and requires user interaction to act upon or dismiss the notification. If the runner goes on to review the tracked activities of the activity log, and thereby reflects on the performances of previous runs, this starts another hermeneutic relation.

After describing the primary relations contained in the example, the vocabulary can be used to break down the relations in further detail. This is done using the remaining elements of the core vocabulary (Table 1). In the running example, the *embodiment* relation described above shows that the runner's perception of the situation is *transformed*, as the system *amplifies* facets of the situation not otherwise perceived. For instance, the runner would normally keep a pace that just feels comfortable, but may now become dissatisfied when hearing a slower than expected pace or expected final time reported by the app. As the runner focuses less on the immediate bodily experience, i.e. *reduction*, and more on the pace reported, i.e. *amplification*, the feeling of exhaustion is mediated by its relation to the de facto performance conveyed by the audio cues. From an existential perspective, the app joins with the runner in shaping the activity of running: the runner becomes *invited* to an objective performance driven activity via the technology (i.e. an *existential translation*).

In terms of the *hermeneutic* relation of the running example, where a run is finished by reflecting on the recorded
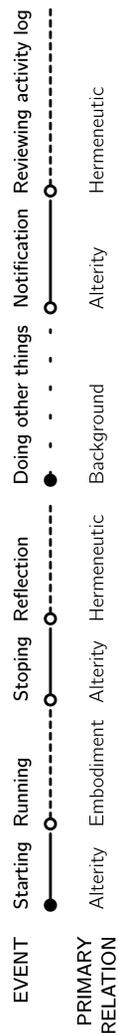
EVENT | Starting Running | Stoping Reflection | Doing other things | Notification | Reviewing activity log

PRIMARY RELATION | Alterity Embodiment Alterity | Hermeneutic Alterity | Background | Alterity | Hermeneutic

Figure 2: Human–technology relations for the running example.

data, the app has become integrated in the routine of going for a run. For the runner, this data-informed reflection is habitual, and running does not willingly happen without it. If the phone is low on battery, for instance, the runner would rather wait for a charge than run without tracking (i.e. *inhibiting* non-tracked training). Running has therefore become existentially *translated* to include the post-run analysis. This analysis further *amplifies* the performance-based metrics of the app, while *reducing* the bodily and emotional aspects not tracked or shown. Still, the transformation and translation of running may result in a more reflective practice since the human otherwise would have been completely responsible for all aspects of reflection. While reviewing the activity log, plans for future training can be *translated* to be in relation to the tracked activities.

The running example displays an *alterity* relation through the simplistic and often manual starting and stopping actions. Furthermore, in order to promote the type of behavior (i.e. relation) that is desired during embodiment and hermeneutic relations, the runner could also spend time between runs customizing settings and familiarizing herself with the available features, thereby also acting in an alterity relation. We can thus say that the perception of running becomes *translated* to include the potential role of technology. Engaging within the alterity relation can conceivably also *invite* running itself, as effort is indirectly spent for this purpose.

Finally, while a *background* relation with the running app may be perceived as the human not being engaged in training, the app's backend components may act upon the lack of use as part of the activity analysis. Such analysis may lead to the app to take action intended to renew the human engagement, e.g., through alternative interaction modalities beyond app-notifications (typically email reminders). As a

natural effect of the physical rest needed by human agents, the background relation is an equally natural part the running routine, and does not necessarily mean that the app is no longer part of a larger use scenario. Furthermore, a running app that would include training programs that are dynamically re-configured based on actual recorded use may play an important role while in a background relation. In this background state, the app thus makes up part of the 'technological texture' of each user's world together with other technologies in a background relation.

Concluding Implications

In this paper, we set out as a response to the growing need for personal informatics discourse that goes beyond a utility-focus (cf. [3, 12]). While this paper represents only an initial step towards a complete framework for this, we take this step by suggesting postphenomenology — as a highly established foundation in other research domains — to be embraced in personal informatics. Postphenomenology strives to describe and analyze technologies in a rich and consistent way that encapsulates the whole of the life-world situation for human agents. The argued utility-focus held by the prevailing quantified self discourse may in the light of our proposed postphenomenological framework be understood as focusing on the hermeneutic relation between humans and technology. The running example we have used shows how personal informatics system use expands clearly beyond the hermeneutic relation in practice, implying the relevance of expanding our discourse to include embodiment, alterity and background relations as well.

Given the seminal role within related research areas such as human-computer interaction, interaction design, and information systems (cf. [2, 15]), that the postphenomenological relations have, there is a rich stream of research that personal informatics could rely upon when embracing

these additional relations. Interestingly, Ihde [6] also identifies what he refers to as 'enigma points', i.e. the points where relation breakdown is most likely (represented by the hyphens in Figure 1), which contributes to personal informatics in terms of likely design and research opportunities of particular relevance.

Finally, as hinted towards by e.g., the notifications of a running app while in a background relation, personal informatics technology may support what we view as transition mechanisms that are intended to guide the human agent from one relation type to another. The impact of, and set of, existing transition mechanisms marks a further design and research opportunity for personal informatics. Such transition mechanism studies should consider at least three questions. One, does the design promote the appropriate relation? Two, does the design promote multiple relations? Three, what are effective transition mechanisms in order to promote appropriate transitions between relations?

Acknowledgements

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