

Theories and Figures of Technical Mediation

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Introduction

How human existence is being transformed by technology is a key topic in the philosophy of technology. Especially in recent empirically oriented philosophy of technology and the related interdisciplinary field of Science and Technology Studies this has resulted in concepts that promise to be of interest not only for historical and anthropological analysis, but for application in design as well. Latour's analysis of *delegation* of action from humans to technologies (Latour 1992), for example, compares to work done at the interface of psychology and design on *affordances* (Norman 1988), *persuasive technology* (Fogg 2003), and *nudges* (Thaler and Sunstein 2008). To make application in design, for user research and usability engineering, feasible there is a need for a framework that collects different concepts and approaches to user influencing effects of technology. The question is what kind of framework would be most convenient for this.

The concept of *technical mediation* has become a key concept for denoting how humans are being changed by technology. Building on the work of Latour (1992, 1999) and Ihde (1990), Verbeek (2005) has elaborated what could be termed a *philosophy of technical mediation*. Technical mediation was however not first, nor only, grasped in the work of Ihde, Latour and Verbeek. Other approaches have also resulted in theories of technical mediation, or at least have provided examples of technical mediation. To contribute to the question how research into technical mediation can be made applicable to design, this chapter provides a survey of research concerning technical mediation from fields as diverse as philosophy, media theory, anthropology and behavioural sciences. To be able to make use of the different approaches, a practice oriented, anthropological approach will be applied. The result will be a *repertoire of exemplary mediation effects* ordered in a *model of interaction modes*.

Collecting and articulating figures of technical mediation in this way can be seen as a rather radical follow up on Verbeek's call for a (post) phenomenological approach. For, it is way of appreciating that technologies can and will always have surprising effects that differ from established conceptualizations. The resulting repertoire of effects is meant as a tool for exploring the mediation effects of products, existent or being designed.

On technical mediation

Technical mediation has become a key concept in contemporary philosophy of technology, for example in *What Things Do* by Verbeek (2005). Technical mediation denotes for Verbeek that human existence is always intertwined with technology. 'How the world appears to humans' and 'how humans act in the world' (perception of the world and action in the world) is always to smaller or larger degree being constituted and transformed by technologies.

Verbeek's practice oriented philosophy of technical mediation was framed in discussion with the rather hostile critiques of technology by scholars such as Heidegger (1977), Jaspers (1931) and Ellul (1964). Their critiques search for the essence of technology, beyond merely investigating the adventures with concrete technologies. Verbeek rejects this approach, that he terms *transcendentalist, or backward looking*. In a backward looking approach phenomena and events are investigated by revealing the conditions behind the diversity of phenomena of the sensible world. As a result of this method, according to Verbeek, too often new technological phenomena are identified with the conditions already revealed. A new technology and its effects on humans then appears too easily as another confirmation of the theory about the essence of technology. This approach is blind towards effects that differ from the assumed essence of technology. The result often was a biased (univocal and too exclusively negative) view of concrete technologies.

By contrast, a forward-looking approach aims to describe phenomena at face value, without in first instance, looking for a confirmation of existing theory. It is attentive to effects that add new themes to the known repertoire. The approach is meant as a revitalization of the phenomenological dictum of *back to the things themselves*. After Don Ihde (1990) Verbeek calls the approach *postphenomenology*. Such an approach makes possible to see how technologies and humans exist together and acquire their characteristics from their mutual dependencies. Verbeek's forward looking philosophy of technical mediation is not hostile to technology, but interested in the effects of technology that have shaped and keep transforming human existence, for better or worse.

Repertoire of exemplary technical mediation effects

Verbeek's mediation approach was elaborated in opposition to dominant approaches in the history of philosophical thinking about technology that he rejected for backward looking. Still, it is possible to employ today's concept of technical mediation for looking back at the history of research into technology. The question that can be asked is which *figures of technical mediation or exemplary technical mediation effects* have been discovered or acknowledged by scholars of technology. I do not set the mediation approach and other approaches in opposition as if they were different positions concerning technology, and where only one can be true. I will treat essentialist and negative theories of technology face value as one possible account of how technology mediates human existence that indeed sometimes was the dominant view.

Whereas Verbeek (2005) and Latour (1999) tend to formulate the best theory to

capture the existence and effects of things, I assume that such a search for a theory is itself part of the practice of live, that involves coping with things and exploring their effects on us. My proposal is similar to the anthropological approach by Henare et al. (2007: 7), who state: “We want to propose a methodology where the ‘things’ themselves may dictate a *plurality* of ontologies. Where he [Latour] presents us with a unifying, revisionist theory of things, we advocate a methodology that might generate a multiplicity of theories. It may be the case that not everything works like a network of hybrids.”

Rather than building a definitive *theory of technical mediation*, I intend to collect typical accounts of how scholars have conceived of the transforming effects of technology. The result is not a synthesized theory of technical mediation, but a *repertoire of figures of technical mediation*. I thus propose to treat different conceptualizations of technical mediation in our own culture in an anthropological way, as if they were ways of coping with technologies to be found in different cultures. The resulting approach may be called *anthropology of reason* (Rabinow 1996): not theory building, but an exploration of how people conceptualize the mediating effects of things in order to cope with them, to accommodate them.

Thus collecting and articulating figures of technical mediation is surely not at odds with the approaches of Verbeek, Latour or Ihde. The approach appreciates and follows up on how Latour discerns different *meanings of technical mediation* (Latour 1999: 178-190), or how Ihde (1990) reviews exemplary conceptualizations (such as Heidegger’s hammer or Merleau-Ponty’s feather). Indeed, favouring explorations of examples over building a theory could be seen as a rather radical follow up on Verbeek’s call for a forward looking instead of backward looking approach.

Model: interaction mode and exemplary effects

In the review of exemplary mediation effects I will use a simple model. The model reflects the existential, post phenomenological perspective of my approach of investigating how people, be it users, designers or scientific scholars, have explored and conceived the influence of technology on their existence. The question of how our existence is mediated by technology is specified as: where does the mediating technology make contact with the human, and what is the effect? When a body is drawn, the following quadrants of mediation effects result (see the conclusion for a visualisation):

- Above the head: Views about how technology drives history on a transcendental level.
- Behind the back: The technological environment indirectly configures subjectivity.
- Before the eye: Technology makes contact with the mind and influences decisions.
- To the hand: The influence operates through contact with the body and directs gestures.

[In the following eight figures are discussed. In the later version of my PhD thesis there are twelve figures. Also two titles have changed, which is indicated in the text.]

Above the head

Typical of many philosophical investigations into technology, such as Heidegger's famous essay *The Question Concerning Technology* (1977) is that the *essence* of technology is sought beyond particular, concrete technologies. In such an abstract philosophical approach there is no demonstrable contact point between technology and humans. The effects occur *above the head*. The philosophical approach deserves credit for having first discovered the importance of technology's transformative effects. Furthermore, abstract figures of technical mediation are and remain relevant for understanding and criticising general appreciations of technology that inform attitudes towards technology (of designers, policy makers, as of users as well). I will discuss *utopian* to *dystopian* conceptions of technology as two figures of technical mediation from the history of the philosophy of technology.

Utopia: miraculous technology for human completion

From the Enlightenment up to well into the twentieth century the dominant conception of technology as a whole was very positive, sometimes *utopian*. Technology was seen as a panacea, ready and waiting to be discovered and developed by humanity. The role of technology as a necessary mediator of human progress was first systematically developed by Kapp (1877). Applying Hegel's dialectical scheme to the relation between humans and technology, he found that humans gain self-understanding only after they have reproduced themselves in technological extensions. The skeleton became to be seen as a mechanism; the heart was defined as a pump; and nowadays the brain is compared to a computer. The utopian figure of technical mediation is that *technology is a miraculous means necessary for human completion*.

A contemporary example of technical utopianism is the movement of *transhumanists*, who believe that the next step in human evolution is to enhance the human being into a cyborg kind of post-human being. For transhumanists in a very literal sense, the merger of humans and technology is the natural way to completion of poor form of human existence. Verbeek (2011) thinks that transhumanists only have an instrumental understanding of technology, neglecting mediation effects. However, one could also say that what is lacking is not acknowledgment of the importance of mediation, but the astonishing belief in the miracles of technology and the absence of a sensibility for ambivalence of technical transformation of human existence.

Dystopia: accumulating technology takes command

In the course of the twentieth century the belief in the miracles of technology was undermined by the advent of the nuclear bomb, environmental problems, and oppressing bureaucracy. The shocking discovery was that technological progress comes at a price. There is no technology that simply liberates people, but technology appeared to make people dependent and it seemed hard to keep technical developments under control. The overall conception of technology reversed from utopian to dystopian (cf. Achterhuis 1998). The *dystopian* exemplary

mediation effect is that all *technology is likely to accumulate into a system that dominates humanity*.

Exemplary of the reversal from utopian to dystopian visions on technology is Michel Foucault's analysis of the *Panopticon* (Foucault 1995: 200-209). The Panopticon is a circular prison conceived by Jeremy Bentham at the end of the eighteenth century (Bentham 1995). The circular design allowed for ubiquitous surveillance from the central watchtower. Bentham claimed that his idea was a great invention that could be used wherever a number of people had to be inspected. He excitedly deliberated on the idea of ubiquitous surveillance as a general model for society: everybody inspecting everybody else. Foucault was equally excited as Bentham about the idea, but for him, as for other critical thinkers, Bentham's utopian image of a panoptic society rather represented a dystopian nightmare.

Behind the back

This and the following quadrants of the model are concerned with concrete technologies, as opposed to abstract questioning of technology's relation to humans. Concrete technologies may influence through direct user-product interaction, changing decisions or bodily gestures, or indirectly, as it were *behind the back*. In the last case, technologies may constitute an environment that directs human history like a river bedding determines the river flow, or may configure self-awareness of user-subjects. With respect to application in design, it is clear that to change the environmental setting is only possible to a limited degree. However, an exploration of the effects of technology *behind one's back* does help to grasp *converging or conflicting trends*. And it may help to understand how concepts like privacy and freedom have become constituted in interaction with the technological environment: the *configuration of user subjects*.

Trends in socio-technical evolution

One effect of technologies on humans working through the environment is the co-existence and interdependence of different technologies. Different technologies in an environmental arrangement can constitute converging trends or, the opposite, cause a conflict of trends. An example is the connection between the inventions of printing and glasses elaborated for example by Marshall McLuhan. The printing press is often considered as an important step that made possible that not only a learned elite, but also society at large has become literate. McLuhan points out however that the printing press could not have achieved this success without the simultaneous availability of spectacles. Without glasses a very large proportion of the population is not able to read. The availability of glasses is an environmental factor without which the printing press could never have been as successful and not have had such a significant impact on society. Both technologies are part of the same trend towards a greater role of the sense of vision in daily life. This is an exemplary mediation effect that could be termed *trend convergence or reinforcement*.

In the case of printing and glasses two developments reinforce each other, but also the reverse effect occurs: a *conflict of trends*. The history of the automobile offers two examples.

The car promises quick transportation for everyone. One result of the success of the car is however the problem of traffic jams. This effect, where the profit of a technology (rapid transportation) beyond a certain point turns into its opposite (traffic jam), was called *overheating or reversal* by McLuhan (2003: 51). The second example related to the automobile is the *jogging effect*, named by Regis Debray (2000: 59). The availability of the car means that people no longer have to walk, with the surprising result that in their leisure time large numbers of people have started jogging. Here too there are two conflicting trends: there is a desire for speed and convenience, but when fulfilled too much it appears opposed to another the desire, of being fit and healthy.

Configuring subjectivity

(environmental conditioning of subjectivity)

Another environmental effect of technology is how technical arrangements configure subjectivity. In modern philosophy a self-conscious, autonomous subject was postulated as an *a priori*. Technical mediation research is one of the strands in contemporary thought showing that the autonomous subject is not a universal and eternal given. Through an analysis of shifting *sense-ratios*, McLuhan (2003) showed how the introduction of writing re-configured subjectivity. With the advent of the script and reading, vision gained importance, at the cost of the senses of hearing and touch. He estimated that electrical media, foreboding today's networked ICT's, would induce a new change. In the era of the script and the eye, the subject detached itself from the objective world to *analyse* it. In the era of network technologies, with renewed importance of hearing and touch, the subject will immerse again in the world to *grope* around in it.

Likewise, Foucault (1977) has suggested that moral consciousness is not universally given, but is being fashioned by the societal apparatus, technologies included. He affirmed that the surveillance and control that are typical of modern societies (the Panopticon being the emblematic blueprint) are being internalised by people, to become self-inspection. This offers a model to investigate how today's technologies re-configure our awareness as subjects, including our conceptions of freedom and of privacy. For example, in the Netherlands there is a controversy over e-payment cards for public transport, criticised for violating privacy. 'Jump on, jump off trains whenever you want, payments proceed automatically, but check in and out is always compulsory/enforced' constitutes indeed a disciplining regime. But 'journey planning, ticket buying, on train control', is a regime that organises and enforces action as well. From a mediation perspective it is more interesting to see how privacy and freedom experiences are not violated, but re-configured.

Before the eye

Next to abstract and indirect modes of interaction, the quadrants before the eye and to the hand collect effects of technology on humans that work through more direct contact between product and user. *Before the eye* denotes mediation effects that work by addresses human decision making. The more common terms of *cognitive* and *physical* interaction (ergonomics)

may also be used. Because of the direct, concrete user-product interaction it is easy to see how behaviour guiding effects in these quadrants can be relevant for design. Thinking about tool use, in the first instance it may seem that cognitive interaction is the most important mode. In this mode users take up tools, see what they can be used for, and employ them according to their intentions and needs. To include in the design, if necessary, cues for the intended use, can help users to employ product to full benefit. In a second instance, however, one may think of how products are often used without thinking about it. That leads to recognizing the importance of human-technology interaction in the *to the hand* quadrant. But first I will describe exemplary effects of technology affecting decision.

Suggestion (guidance)

One type of technical mediation in the category *before the eye* is *suggestion* that products may give to users about possible use. A well-known concept that helps to understanding impacts on behaviour through cognitive suggestion is *affordance*. Norman (1988), a pioneering scholar in cognitive ergonomics took the notion of affordance from the field of environmental psychology and elaborated it in the context of design. Affordances, in the applied sense of Norman, are the use action possibilities that users recognise when they perceive products. The concept of affordance helps to analyse how buttons, grips, displays, meters, ribs, etcetera, all physical features, are cognitively associated with possible actions, uses.

Many examples by Norman concern doors and switches. For example, Norman tells about a man who got caught between the two rows of doors in a European post office. The doors seemed locked. In fact, he had only pushed on the wrong side of the door. Norman's approach is not to blame the user, but to point out that the handle and door apparently conveyed the wrong signal. In another example, Norman describes how people stumble in trains when doors open automatically or they bump against doors that do not open when people do expect so. Again, according to Norman, an affordance, in the sense of a suggestion guiding towards proper user behaviour, was missing. An example of good design, that Normans refers to is the door handles in cars, often making use of a recess in the door that fits the hand. The unlocking and opening the door then proceeds in one gesture that is accurately suggested by the design of the grip.

Persuasion

Besides suggestions for appropriate use, products can also *persuade* users to change behaviour. This effect was elaborated by Fogg (2003) with the concept of *persuasive technology*. Central in Fogg's approach is the captivation of attention (taken from rhetorics), which shows that he focuses on effects that work cognitively, addressing user decision making. Compared to suggestion, persuasion can be characterised as a stronger type of influence on behaviour (cf. Tromp et al. 2011). An example is the speedometer on the side of the road that displays the speed of approaching cars. This road sign does not just provide neutral feedback about the speed, but it tries to convince drivers to change their behaviour and keep to the speed limit.

Another example of a concept that falls mainly in the category of cognitive interaction is *nudge*, put forward in the recent and very successful book with that same title by Thaler and Sunstein (2008). Despite the fact that nudge literally means little push and is thus reminiscent of physical interaction, the examples provided in the book concern the role of technologies in *pre-structuring choices* for actions. One such example is the display of foods in a school cafeteria. The arrangement of articles in the display influences the choices consumers make. It makes a difference if healthy foods placed centrally in the display or fast food. When this is being acknowledged, it must become a design consideration, Thaler and Sunstein affirm, especially when it concerns commonly shared values such as health.

To the hand

Some of the clearest examples of technical mediation of behaviour are of the type of physical behaviour steering. Constraining technologies in the form of fences, locks, etcetera, often associated with high risks with respect to safety, security, or health, are widespread. When behaviour is less critical, or when consensus on behaviour objectives is lacking, cognitive guidance, providing information for decision making, seems to be the dominant option imagined by designers and policy makers. Physical constraints seem to be considered as more disturbing than cognitive cues. This is however not necessarily correct from the perspective of a philosophy of technical mediation. Exemplary effects in the category *to the hand* vary from physical *coercion* to *mediated gestures*.

Coercion

A concept that helps exploring effects of this type of physical influences is *delegation* as elaborated by Latour (1992). Many everyday products enforce certain behaviour on humans. Latour wittily discusses a speed bumps making car drivers slow down, door grooms ensuring that doors are being closed, and hotel keys with heavy key fob disciplining hotel guests to leave the keys at the hotel desk. Technologies carry with them a *script*; guiding users it like a movie script helps actors. When products guide humans, Latour thinks this implies the *delegation* of morality from people to products. Clearly, when action is being delegated from humans to things, decision-making is overruled. The exemplary mediation effect is that technology may direct people by harder or softer form of physical *coercion* (cf. Tromp et al. 2011).

Technical mediation in general links together designer and product, and product and user. The analysis of technical mediation can focus on products influencing users, or on people directing other people by means of technology. Latour's approach does consider the distribution of roles, but the focus is on how products influence users. A good example of the figure of people directing other people by means of technology is Winner's analysis of the overpasses to Long Island. Architect Robert Moses designed those overpasses very low to deny access to buses, and thus used architecture as a vehicle for his racist political ideas (keeping away black, poor people). Winner used this as an example to show that *artifacts have politics* (Winner 1986).

Mediated gestures

Coercion is not the only form of physical interference. Products can also structure gestural routines. Products such as pencils or a bicycle are used without much thought. And if one does think about it, they are rather experienced as comfortably integrated and empowering, than as constraining. Still, these technologies do constrain, or structure human activities. Historical studies into discipline (Foucault 1977), concerning learning to write at school for example, bring to the fore that many everyday skills depend on much training that is afterwards mostly forgotten. Through training, technologies become embodied, as if they were members of our own. At the same time, the technologies fashion and mark the user's gestural routines that develop. Body technique (the skilled use of one's own bodily members) and technology (artificial quasi-members) mutually influence each other (Tenner 2003).

In a study about *zori*, Japanese sandals, Tenner (2003: 51-74) points out that footwear does not simply make walking easier, but that in the course the specific type of footwear does transform people's walking gait and even their physical foot shape. Hard to imagine for western shoe-walkers is that in other regions people easily walk long distances barefoot. Quite some practice and habituation is necessary to change from shoe walking to bare foot walking, or the other way around. Moreover, the kind of footwear also marks the style of walking. Japanese people are often recognizable for striking the tip of their feet over the floor. Tenner affirms that this walking technique can be associated with the tradition of walking on *zori*: children having to wear *zori* at school seems at least partly responsible for the formation and transmission of this particular walking technique.

Conclusion

The repertoire of technical mediation effects discussed above can be summarized in a model:

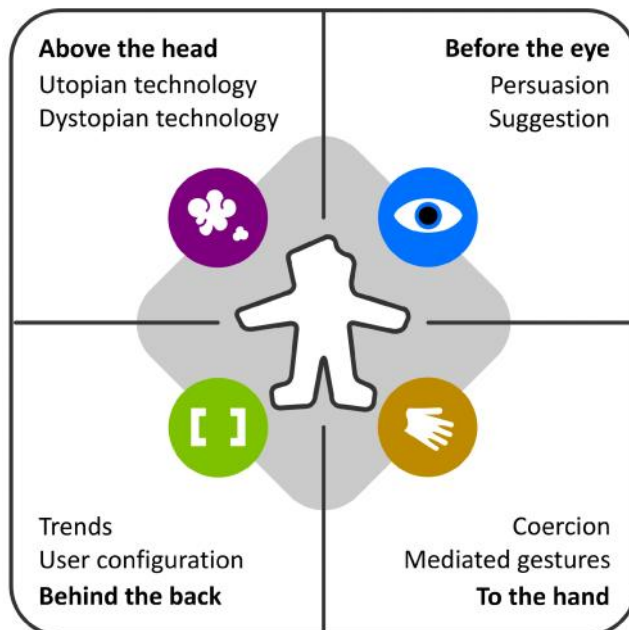


Figure 13.1 Human conceptualizations of how technology influences them

The model and repertoire collect human conceptualizations of how technology influences them. It is not meant as an ultimate theory, but describes how humans have explored and conceptualized the influences of technology while coping with them. This approach was termed an anthropology of reason, of conceptualizations of technical mediation. As a contribution to the *philosophy of technical mediation*, this method allows to combine the various discoveries in different periods and approaches. I have attempted to bring together and appreciate both the strong claims about technology often found in the philosophy of technology with the more subtle analysis common in anthropological research, and the operational concepts in design for usability. The different concepts thus collected do not have to be considered as pieces of a puzzle that can be nicely put together, and where sometimes pieces must be abandoned because they don't fit in the puzzle. Instead, I allow different perspectives to remain in competition or to show overlap. As a result, philosophical analysis of technology *above the head* don't have to be dismissed, but they do have to be complemented by investigations into more concrete interactions (in the three other quadrants).

The intended function of the repertoire is to be of help to designers (but also users and scholars of technology) to become better *aware* of the transformative effects of technology. Instead of the dominant approach in design to search for technical solutions for predetermined user needs, the repertoire can support a session of *thinking the other way around*: analysing how the product that is being designed changes users. Such a session, employing the model, makes better aware, for example, that there is often a choice between physical, intuitive modes of interaction on the one hand and cognitive interaction on the other. And it allows to discuss social and ethical issues, not only by checking with assumed universal values, but by estimating how a product compares to technological and societal trends that shape and transform values.

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