

Beyond Interaction: A Short Introduction to Mediation Theory

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The field of interaction design is founded upon the idea that, ultimately, it is not *things* that are to be designed, but rather the *interactions* between humans and things. Still, interaction might not always be the most helpful concept for understanding the relations between humans and products, or for understanding technological artifacts in general. Recent insights from the philosophy of technology, specifically from the approach of “technological mediation,” lead us to rethink the relations between humans and things, shedding new light on the field of interaction design. In fact, these insights make it possible to rethink

both the interaction dimension of interaction design and the very idea of designing interactions itself.

Interaction can be translated literally as “action in-between.” It indicates what is going on between a human being, on the one hand, and a technological artifact, on the other. Both entities have a relation to each other and act upon each other. The concept of interaction therefore presupposes the existence of human subjects and technological objects, *between* which there is a specific kind of *activity*. While questioning this pre-given character of subject and object might sound a little far-fetched,

Insights

- Interaction is just one of many possible relations between humans and technologies.
- Mediation theory can help designers to anticipate the impact of a product on human practices and experiences.
- Responsible design does not shy away from influencing human behavior, but rather aims to give such influences a desirable direction.



it can actually help expand the field of interaction design.

First, from the perspective of the “mediation approach” in philosophy of technology, humans and technologies should not be seen as two “poles” between which there is an interaction; rather, they are the *result* of this interaction. As I will make clear below, they are not pre-given entities but rather ones that mutually shape each other in the relations that come about between them. And second, in many cases the relation between humans and technologies is in fact part of a larger relation, between human beings and their world, in which technologies play a mediating role. What is being designed, then, is not a thing but a human-world relation in which practices and experiences take shape.

The design of interactions therefore implies not only the design of technological objects that allow for specific interactions, but also the design of the human subjects who interact with these objects. Designing technology is designing human beings: robots, vacuum cleaners, smart watches—any technology creates specific relations between its users and their world, resulting in specific experiences and practices. Here, I will investigate how we can further conceptualize the relations between human beings and technologies and what this could imply for the practice of design.

HUMAN-TECHNOLOGY RELATIONS

In the field of design, the interactions between human beings and technological artifacts are often characterized in terms of functions and use. Products are designed to be used, after all, and therefore the quality of the interaction that people can have with a product is typically indicated in terms of functionality and usability. Yet there is a risk in this conceptualization. First, many relations we have with high-tech products cannot be characterized

adequately as “use” relations. Technologies like smart lighting in shop windows that analyze people’s gaze in order to highlight specific products, or electrodes implanted in the brain to influence brain activity, are not used. The configurations of users and technologies that arise here can be better characterized as *immersion* and *fusion* than as use.

Moreover, understanding human-technology interactions in terms of functionality too easily reduces the role of products to instrumentality: Human beings have their own goals and intentions, and products should help them to realize them in an optimal way. In many cases, though, these goals and intentions do not exist independently from the technologies that are used. Social media has generated new types and dimensions of social relations that were not intended in the design of the technology, but rather emerged from them. These technologies do much more than merely function—they help to shape human existence.

The relations between humans and technologies, then, are much more complicated than functionality and use. On a more conceptual level, three approaches to human-technology relations can be distinguished: Technologies can be seen as extensions of the human; there can be a dialectics between humans and technologies; and human-technology relations can be approached in terms of hybrids.

Extension. When approaching human-technology relations in terms of extensions, technologies appear primarily as tools or instruments. They enable human beings to do specific things. In this view, technologies are typically seen as neutral. As extensions, they merely facilitate human practices and experiences, rather than actively helping to shape them.

A good example of this approach is Joe Pitt’s work on the neutrality of technology [1]. Pitt defends the thesis that it is highly undesirable to give up

the idea of the neutrality of technology, from a moral point of view. As soon as we bestow material artifacts, rather than human beings, with agency, we dilute the idea of moral responsibility. Seeing technologies as more than neutral opens the door to arguments like “the machine made me do it” [1]. Pitt claims this view pretends that humans can share responsibilities with technologies, and therefore provides an unjustified moral excuse. Driving too fast is not the car’s fault, just like a murder cannot be blamed on the weapon. Humans, not technologies, have agency and can be held responsible for their actions.

Another variant of extensionism can be found in the “extended mind theory,” as defended by Andy Clark and David Chalmers [2,3]. Cognition, they claim, cannot be limited to the human mind, but rather is extended to the material artifacts people use, such as agendas, computers, and even brain implants: They help us to think, remember, and have experiences. This approach to technologies as extensions of the human being, though, is in fact a variant of the hybrid approach I will explain below. Clark and Chalmers show that technologies help to shape what it means to be human; technologies do not merely extend a pre-given human subject with a material object, but rather become part of human functioning.

Dialectics. Another approach to human-technology relations has a dialectical nature, in the sense that it sees an opposition rather than a continuity between humans and technologies. Instead of enabling people to realize their own intentions, technologies are a significant force themselves. One version of this dialectical approach is the framework of opposition versus resistance [4]. Technologies are then seen as overpowering or alienating forces, while human beings need to find ways to free themselves from them. Good examples are the Marxist critique of mechanization, in which the laborer is alienated from both the production process and the products themselves, and the current critiques of information technologies and their impact on our cognitive skills [5,6].

Another version of the dialectical approach gives the tension between humans and technologies a more productive character. It sees

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technologies as “externalizations” of specific aspects of the human being, which make possible human development. In Ernst Kapp’s philosophical-anthropological approach to technology, for instance, technologies are seen as projections of human organs [7]. A hammer is a projection of the fist, a saw of teeth, and the telegraph network—the high-tech of his day—of the human nervous system. And Wilhelm Schmid sees the development from tool to machine to automaton as an ongoing externalization of human capacities: While tools still have to be operated both physically and mentally by human beings, machines take over the physical part, and automatic machines take over the cognitive part [8]. Interacting with technologies, then, gives us a relation to ourselves as well.

Hybridity. The hybrid approach sees a fundamental problem in both the instrumental and dialectical approaches. Approaching technologies in terms of extension of or opposition to the human being implicitly locates humans and technologies in two distinct spheres: one of the human subject, the other of the technological object. And this separation fails to grasp the complex intertwining of humans and technologies. To understand this intertwining, we need to think in terms of hybrids. Technologies and human beings help to shape each other. Technologies are an element of human nature: They are part of us. Our perceptions and experiences, our actions and ways of living, all these elements of human existence take shape in close interaction with technologies.

Technological instruments, for instance, help scientists to perceive the world. The reality of a star is profoundly mediated by telescopes, brain activity by MRI scanners, and the health condition of a fetus by ultrasound devices. Such mediations are not merely neutral “intermediaries”: What a star, the brain, and an unborn child are for us cannot be understood without taking into account the mediating role of technologies in our perception and understanding of them. The same can be said of human behavior. Technologies help shape the ways we behave and interact. The default settings of copy machines and printers help to determine how many double-sided prints will be made. Antenatal diagnostic technologies

inform the ethical decisions we make. The quality of our social interactions and relations is mediated by social media and the built environment.

The concept of technological mediation can be helpful in investigating this hybrid character of human-technology relations. In the postphenomenological approach to technology that developed out of the work of Don Ihde [9,10], technologies are conceptualized as mediators in the relations between human beings and their world. Rather than being opposed to humans, or mere extensions of us, they need to be seen as media for our connections with the world. Technologies help shape perceptions and actions, experiences, and practices. In doing so, they help shape how human beings can be present in the world and how the world can be present for human beings.

This implies that designers, in fact, do not merely design products, but human practices and experiences as well. Products do not only have functional, interactive, and aesthetic qualities, but are in fact also mediators in the lives of human beings. Designing things is designing human existence. Dealing with this situation in a responsible way requires a thorough conceptualization of human-technology relations and the role that design can play in shaping them.

MEDIATION THEORY

In order to investigate the mediating role of technologies, it is helpful to study the relations between humans and technologies along several lines. First of all, building upon and expanding the work of Don Ihde, we can categorize various types of *relations* between humans, technologies, and the world. Second, we can identify various *points of application* from where technologies exert their influence on human beings. And third, several types of *influence* that technologies exert on human actions and decisions can be distinguished.

Types of relations. At the heart of Don Ihde’s postphenomenological approach to technology is an analysis of various types of relations between human beings, technologies, and the world. Ihde investigated the ways in which technologies play a role in human-world relations, ranging from being “embodied” and being “read” to being

“interacted with” and being “in the background.” In *embodiment* relations, technologies form a unity with a human being, and this unity is directed at the world: We speak with other people *through* the phone, rather than speaking *to* the phone itself, and we look *through* a microscope rather than *at* it. Ihde schematizes this relation as (human - technology) → world.

Hermeneutic relations, as Ihde calls them, are relations in which human beings read how technologies represent the world, such as an MRI scan that represents brain activity or the beeping of a metal detector that represents the presence of metal. Here, technologies form a unity with the world, rather than with the human being using them. Humans are directed at the ways in which technologies represent the world. Schematically: human → (technology - world).

In a third type of human-technology-world relations, which Ihde calls the *alterity* relation, human beings interact with technologies with the world in the background of this interaction. Examples are human-robot interactions, getting money from an ATM, and operating a machine. In fact, this relation can be seen as a central domain of interaction design. It can be schematized as human → technology (world).

Fourth, Ihde distinguishes the *background* relation, in which technologies are the context for human experiences and actions. The sounds of air conditioners and fridges, the warm air from heating installations, the notification sounds from cellphones during a conversation—in all of these examples, technologies are a context for human existence, rather than being experienced themselves. Schematically: human (technology/world).

Many recent technologies, however, do not fit into one of these four categories [11]. There are configurations of humans and technologies that are even more intimate than an embodiment relation, while others have a more powerful contextual influence than the background relation. A brain implant, for instance, that is used for deep brain stimulation to treat Parkinson’s disease or psychiatric disorders, is not merely embodied; rather, it merges with the human body into a new, hybrid being. I have proposed to call this a *cyborg* relation: human/technology → world.



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Other technologies merge with our environment, into “smart environments” with “ambient intelligence” and sometimes even “persuasive technologies” [12]. Here, technologies are not just a background for our existence, but rather an *interactive* context: They detect if people are present or not, recognize faces, give feedback on behavior. This configuration of *immersion* can be schematized as human \leftrightarrow technology/world.

Wearable technologies such as Google Glass give yet another human-technology configuration. They result in a bifurcation of the human-world relation: On the one hand, smart glasses can be embodied to give an experience of the world, while, on the other hand, they give a representation of the world in a parallel screen. This relation could be called *augmentation*, combining an embodiment relation and a hermeneutic relation: (human - technology) \rightarrow world + human \rightarrow (technology - world).

Points of contact. A second dimension of human-technology relations concerns the “contact points” between human beings and technological products. In all of the human-technology-world relations discussed above, there are specific types of connections between users and products. Steven Dorrestijn has developed a framework to categorize these contact points, using the human body as a reference [13]. He distinguishes four types of contact, corresponding to four zones around the human body: “to the hand,” “before the eye,” “behind the back,” and “above the head.”

The first two zones concern the ways in which individual human beings encounter technologies: physically (to the hand: bodily interaction with technologies, like crossing a speed bump) and cognitively (before the eye: interpreting information given by the technology, like stopping at a red traffic light). The last two zones are contextual: behind-the-back refers to the material infrastructure that has an impact on our actions and experiences (like using the train only if there are good connections between one’s home and the railway station), and above-the-head refers to the role technology plays in our thinking (like having utopian or rather dystopian expectations of the social impact of technology).

Types of influence. The third and last dimension of human-technology

relations concerns the character of the influence that is being exerted on human beings. Nynke Tromp et al. have distinguished two dimensions in the influence of technologies on human beings: its *visibility* and its *force*. The impact of technologies can be located somewhere on the continuum between “hidden” and “apparent,” on the one hand, and between “weak” and “strong,” on the other [14].

Strong, apparent influences can be called *coercive*: turnstiles that force you to buy a ticket before entering the subway, or cars that won’t start when you don’t wear a safety belt. Weak, apparent influences are *persuasive*. Technologies show their influence, without being overpowering: smart energy meters that give feedback on your energy consumption or e-coaching apps that help you lose weight.

The hidden types of influence are often seen as a little more creepy, but in fact they are very common. Hidden, weak influences can be called *seductive*. Their impact is non-cognitive and mild: placing a coffee machine in the hall of a company to stimulate social interaction, using material that ages beautifully to prevent people from discarding a product prematurely [10,15]. The final type of influence is both strong and hidden; it can be called *decisive* or *implicative* because it exerts influence without this influence being noticed. An example is an apartment building without an elevator, implicitly forcing people to use the stairs.

Mediation. Within these three dimensions, technologies help shape human experiences and practices. Rather than being external to human beings, they help define what it means to be human. Technologies help us develop our knowledge of the world, our moral actions and decisions, and even our metaphysical and religious frameworks: MRI scanners provide neuroscientists with a highly specific way to access the brain, while obstetric sonography informs ethical decisions about abortion, and IVF reorganizes the boundary between the given and the made, or fate and responsibility. Technological mediation is part of the human condition—we cannot be human without technologies.

This makes the design of technologies a highly responsible activity. Designing technology is designing humanity, in a sense. Any

technology will help to shape human actions and experiences, and will therefore have an impact that can be understood in ethical terms. Designers materialize morality [16]. Therefore, along with functionality, interaction, and aesthetics, mediation deserves a central place in the conceptual framework that implicitly and explicitly guides design activities.

THE ETHICS OF DESIGN

How, then, can designers take mediation into account in their design work? First, designers can try to *anticipate* mediations when designing a product. Imagination can be a powerful tool for that, and the mediation framework described here can help guide one's imagination through various dimensions of the relations between humans and products.

A more invasive approach is to *design* mediations explicitly into products. Rather than preventing unintended and unanticipated mediations, the ambition is then to design products that explicitly have an impact on people's experiences and practices—like the speed bumps and double-sided printers mentioned above. The “nudge” approach defended by Richard Thaler and Cass Sunstein [17] has a similar ambition: gently influencing people's behavior in a specific direction.

Explicitly influencing people via design is a contested thing to do, though. It puts something at stake that has become one of the most sacred things in contemporary Western culture: human autonomy. For that reason, for instance, Thaler and Sunstein explicitly call their approach a form of “libertarian paternalism.” It is inevitably paternalistic, in the sense that it exerts influence on human beings, but at the same time it explicitly aims to be libertarian, in the sense that it always gives people the possibility to opt out. Nudges should never be given invisibly or without the possibility of avoiding them.

From the perspective of mediation theory, though, this focus on autonomy is not very helpful. Without giving up on human freedom, to the contrary, mediation theory shows that technologies always mediate human practices and experiences. Rather than seeking to eliminate these

unavoidable impacts of technologies, we should make the best of them. And rather than seeking for autonomy against the powers of technology, we should seek to develop responsible forms of mediation. Users, designers, and policymakers should be enabled to read, design, and implement technological mediations, in order to be able deal in a critical, creative, and productive way with powers that remain hidden otherwise [18]. Human freedom cannot be saved by shying away from technological mediations, but only by developing free relations to them, dealing in a responsible way with the inevitable mediating roles of technologies in our lives.


CONCLUSION

At the intersection between interaction design and philosophy of technology, a lot of interesting work is to be done. Philosophy of technology can offer conceptualizations of the relations between humans and technologies that deepen our understanding of what *interaction* can mean in interaction design. At the same time, the field of interaction design is a rich source of inspiration for philosophy of technology, as the place where new types of human-technology relations emerge, and where designer intent and use practices meet. The concept of mediation can be the bridge between the fields: Rather than seeing technologies as functional, we need to understand how they play a mediating role in human practices and experiences. Technologies-in-use help shape relations between users and their environment. Mediation theory can help us analyze the various shapes these relations can take, the points of application between a technology and its user, and the specific types of mediation at play. Designing interactions is designing relations between human beings and the world, and, ultimately, designing the character of the way in which we live our lives.

ENDNOTES

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