Chapter 5
Human Practices in Technological Contexts

After having dealt with the first challenge in the previous chapter, this chapter focuses on the second challenge: conceptualizing different forms of technological mediation to understand how technologies alter human action on a more detailed level. Meeting this challenge calls for reformulating Bruno Latour's mediation theory so as to incorporate insights from Alasdair MacIntyre as outlined in the previous chapter. Most important in this respect is MacIntyre's notion of practices, his idea of being biologically vulnerable and socially interdependent, and his distinction between practical reasoning and having reasons.

5.1 Reinterpreting Technological Mediation

The previous chapter argued for understanding practices in the context of actor networks. In techno-social networks, we perform coherent and complex forms of socially established cooperative human activity through which virtues are cultivated. Of course not all organized activities are practices, but in many activities we strive for doing good as in activities such as parenting, teaching, engineering, or painting.

MacIntyre's and Latour's views of human agency are future integrated by noting the extent to which people are biologically vulnerable, socially interdependent and technologically mediated. However, Latour defines agency in terms of the effects an entity (technology or person) brings about in the networks, while MacIntyre defines agency in terms of virtues. Consequently, Latour sees both technologies and people as agents or actants, but MacIntyre would not call technologies agents. MacIntyre makes, based on the recognition of virtue, a strict distinction between the action by things and humans (MacIntyre 2007, p. 201):

> The individual qua individual appears not only in managing the transitions from one role to another, but also, as I suggested earlier, in the role-playing itself. There are some roles that may seem purely mechanical, since the individual who plays the role always be replaced by a machine: where there was once a ticket-seller, there is now a ticket-machine. But the

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> ticket-seller always faced choices that machines never confront: how to play her or his role, cheerfully or sullenly, carelessly or conscientiously, efficiently or inefficiently. And for all roles, the way in which the role is enacted presupposes not only an answer to a question posed to and by the role-player: "How is it best for me to play this role?," but also to such further questions: "By what standards am I to judge what is best?" and "Should I continue to play this role in this way?"

As a consequence, MacIntyre's understanding of agency does not apply to technologies. Artifacts simply lack virtues, moral beliefs, and the capacity to reason. But this still allows room for acknowledging that technologies play an important social role. Simply put, we can bridge the two authors by arguing that both technologies and people are *social factors*, while only humans are *moral actors*. With this reinterpretation, ANT poses a problem for MacIntyre's ethics since Latour argues that the social roles of technologies can change intentional actions into mere behavior (Callon and Latour 1992, p. 361):

> What is interesting, though, is that campus managers decided to shift the program of action "slow down cars on campus" from a culturally learned action to a mere piece of behavior—the physical shock of concrete bumps on the suspension of the cars. The program of action: "Slow down please for the sake of your fellow humans" has been translated into another one: "protect your own suspension for your own benefit." Are we not allowed to follow this translation through? Who made the move from action to behavior, from meaning to force, from culture to nature? We the analysts or they, the analyzed? Who or what is now enforcing the law, the standing or the sleeping policeman?

Latour argues that when speed bumps are built to slow down the traffic, slowing down is not a *moral* action in the sense that the action is not motivated by the desire to do good (Callon and Latour 1992). The original program of action "slow down please for the sake of your fellow humans" has been translated into "protect your car's suspensions". The outcome of these actions may be the same, and therefore Latour does not see the problem of ignoring differences between humans and technologies. But there can be a real problem when reasons for actions shift substantially. Technologies such as the speed bump can shift the starting point of our reasoning from caring for others into self interest.

One could argue: "So what? As long as people can safely cross the street, everything is fine, isn't it?" With speed bumps, this may indeed be a suitably pragmatic point of view. But often we also want people to be motivated by the desire to do good. For instance, some internet services offer to send yearly birthday and Christmas cards to loved ones. For forgetful people, this may seem to be a great solution. But what does it mean to receive a yearly card that was sent by some computer program? The virtuousness has disappeared in such cases.

So, the social role of technologies can be problematic in that we do not perform moral actions but show mere behavior: practices are no longer practices in the sense that they serve moral goods. And even though not all technologies alter human actions into mere behavior (many technologies may do just the opposite since they provide more options for actions, see also Sect. 5.3), a Latourian approach does not draw attention to our intentions: it describes intentional actions as if they were merely behavior that arises from human-technology associations. It is not the case that we

must be completely free from external influences to be moral agents. Chapter 4 showed that MacIntyre's theory offers a valuable account of human agency in which our reasons for actions are biologically and socially given. We need food, water, fresh air, housing and clothing. We can suffer from diseases and mortality, and consequently, we are dependent on the goodwill of others to cooperate with us. We cannot survive, let alone flourish without others. But even though we are biologically vulnerable and socially interdependent, we are still moral beings in the sense that we can acquire the four goods by using our ability of practical reasoning. So, although biological conditions and social surroundings provide us with reasons for actions – and therefore limit our freedom – we can still reflect on these reasons, our actions and lives. Based on this reasoning, we can aim to alter course and become more responsible, even though we are not fully autonomous. Note that we are not always aware of our reasons: We do many things unreflectively and we would not say that we exert our agency when we do something unknowingly. An itching mosquito bite can cause unconscious scratching. But if one starts actually thinking and realizes that it is better not to scratch for it only makes it worse, not scratching becomes exerting agency, while the act of scratching was not.

Here, the comparison between being socially dependent and being affected by technologies can be made: other people can change your reasons for action, but as long as you are able to use your capacity of practical reasoning on those reasons, you can still take responsibility. This chapter argues that the same can be said for technological mediation. Technologies may alter our reasons for actions, but – as long as we are not discussing mind altering technologies such as psychopharmaceuticals and deep brain stimulation – they do not alter our capacity for practical reasoning.

A reason is a basis or motive for an action: it is why someone does something. Providing a reason is giving an argument, telling why one did or plans to do something. Reasons are those motivations for actions that can be reflected upon by people. MacIntyre argues that humans have a reason for action if he or she perceives that the action fulfils some aim. For instance, being thirsty is a reason for drinking some water. We do not have to be conscious of the motive for action, nor does a motivation for an action need to be explicated before it can be called a reason in the MacIntyrean sense of the word. But in order to take moral responsibility for one's actions, it is needed to become conscious about one's reasons, to explicate them and to reflect on them.

To be able to reflect on our reasons for actions (which is needed to make our actions entirely our own), we need to understand how our reasons are changed by technologies. Exploring how technologies mediate our actions by altering our reasons for action requires a revision of Latour's idea of mediation. Latour focuses on the outcomes of actions and pays little attention to reasons. His interest is on how our doings are mediated by technologies. ANT does not provide an understanding of who we are and why we do certain things. In other words, it does not provide any insight into our agency, and therefore it limits our understanding of how we can take moral responsibility.

His output oriented approach provides a suitable anthropological method to study socio-technological change from an external perspective. It clarifies how

accumulative interactions between humans and technologies lead to new, unexpected outcomes, but it fails to make explicit how technologies mediate our actions and how we can regain control. By addressing the idea that technologies mediate our reasons for actions, which are evaluated in a process of practical reasoning, we can empower people to take moral responsibility.

Additionally, the idea of technologies and people "merging in action" in the network does not coincide with our experiences. It is true that people behave differently when they take their bikes for a small tour, than when they go for a walk. For instance, when walking, people from the Southern Dutch countryside greet everyone, often adding some friendly remarks about the weather. But, when cycling, they often only say hello to the people they know, and ignore strangers. Walking with at a pace of about 3.5 km an hour grants people plenty of time to salute everyone in a friendly manner. Biking at 20 km an hour, gives people far less time to greet others and make small talk. So indeed, the bike is mediating people's behavior. But, this does not mean that we are merged in action with the cyclists in the sense that the bicycle and the bike become a new agent by composition?

Our actions are not mediated by technologies in the sense that agency is the result of human and non-human associations. Instead, technologies mediate our actions by altering the reasons behind them. In the example of the bike, this simply means that you have less time to talk to other road users when you bike quickly. The reason behind the decision "to greet or not to greet" comes down to the matter of having time, and not of having become a new, merged agent with the bike. One could easily slow down a little and greet other people. Adding the distinction between having reasons and the capacity of practical reasoning (or pragmatic reflection) to mediation theory makes this theory more in line with everyday experience.

This chapter explains how technologies mediate our reasons for actions, and aims to explore what this means for our ability to take responsibility. This exploration is based on the distinction between three types of reasons for actions that together provide the input for further reflection on being the distinction between "is", "can", and "ought". The first type of reasons is formed by our factual beliefs. What we believe to be the case is closely related to how we see the world. The following section (Sect. 5.2) starts with analyzing how Peter-Paul Verbeek combines Latour's idea that technologies mediate our actions with the post-phenomenological notion of Don Ihde which explains that technologies mediate our perceptions of the surrounding reality.

Second, our reasons for actions are related to what we can do, or put differently: we also act in certain manners because we have options to do so. On the one hand, options for action limit our capabilities, but on the other hand, people often want to expand their options. Technologies mediate these kinds of reasons because they provide new, remove former, or alter existing options. Section 5.3 explains how technologies mediate our options for action.

Third, our reasons are based on our moral beliefs regarding moral values, norms, and virtues. Tsjalling Swierstra and Arie Rip have explained how new and emerging technologies such as nanotechnologies change our moral beliefs (Swierstra and Rip 2007). Section 5.4 offers an account of how technologies mediate our morality.

Finally, the last section (Sect. 5.5) analyses what this all means for the possibility of taking responsibility for the social role of technologies.

5.2 What Do We Perceive? Technological Mediation of Factual Beliefs

Verbeek 's *What things do* (2005b) was an important contribution to the debate on the social role of technologies. Verbeek distinguished analytically between the existential dimension and the hermeneutical dimension of mediation. The first form refers to the mediation of action and the second refers to the mediation of perceptions. Verbeek argues that Latour's view of the "existential dimension" of technological mediation does not describe the social role of technologies to the fullest extent. Therefore, Verbeek has elaborated on Latour's theory, and added with the help of Ihde's post-phenomenology, the hermeneutical dimension.

Verbeek's view is more comprehensive than either Latour's or Ihde's approach. He presents these two forms of mediation as an analytical distinction between two parts of the same process: it is not two processes that may play a role, but two sides of the same coin. However, this section argues that the hermeneutical dimension provides a deeper understanding of mediation of action since it explains how certain reasons for our action change. So it is not two sides of the same coin, but causal mechanisms: when our perceptions of surrounding reality changes, we have reasons to act differently. But the other way around this does not hold true: if we act differently, we rarely get different perceptions of reality.

Just like ANT, Ihde's post-phenomenology is an influential approach that aims to understand the broad social impacts of technologies by overcoming the subject-object dichotomy. But regardless of their similarity, post-phenomenology is often understood to be opposed to ANT (Ihde and Selinger 2003; Latour 1991). Still Verbeek has worked to integrate both approaches in an overarching post-phenomenological account since he argues that their views bridge the subject-object dichotomy in similar ways. Phenomenology overcomes the dichotomy by explaining that reality arises through relations between humans and their surroundings: humans must be understood as constantly experiencing the (phenomena of the) world while realizing their own existence in this experienced world. Post-phenomenology adds to the view that these relations are mediated by technological artifacts. This hermeneutical dimension of mediation refers to the transformation of human interpretations of reality. According to Verbeek, reality arises in the technological mediation between humans and the world: "Technology mediates our behaviour and our perception, and thereby actively shapes subjectivity and objectivity: the way in which we are present in the world and the world is present to us" (Verbeek 2005b, p. 203).

According to Verbeek, the mediating role of artifacts should not be understood as intermediating between humans and the world. Instead, mediation constitutes both subject and object at once (Verbeek 2005b, p. 130): "Humans and the world they experience are the products of technological mediation, and not just the poles between which the

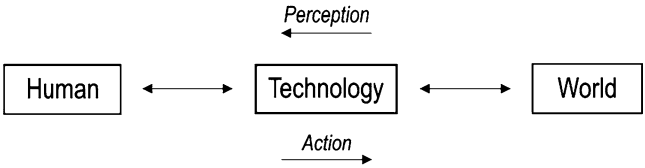

Fig. 5.1 Technological mediation according to Peter-Paul Verbeek (Source: Peter-Paul Verbeek, Lectures Industrial Design. Adapted from Ihde)

mediation plays itself out". Phenomenology focuses on explaining how we perceive or experience the world. Technologies mediate this experience. Post-phenomenology explains that experiences and meanings in our technological culture are regularly mediated. This idea is schematically presented in Fig. 5.1. The concrete examples Verbeek and Ihde mention include glasses, microscopes, and wheelchairs. They show that all these technologies transform the user's interpretations of the world.

Post-phenomenology teaches that we observe the world through technologies that transform our observations (microperception). A microscope makes it possible to see small particles or cells, but simultaneously excludes the larger context in which these materials were embedded earlier. Additional to the mediation of such microperceptions, Ihde (Idhe 1993) identifies macroperceptions. Macroperceptions consist of our worldviews, our understanding of the world. The invention of the letterpress, photography and film has tremendously altered the world-view of the average person. Of course these macroperceptions are informed by microperceptions, and vice versa. In other words: macroperceptions are interpretations of microperceptions. Since microperceptions are mediated by technologies, macroperceptions are also technologically co-shaped.

Verbeek explains that Latour's approach of mediation of action can be made commensurable with Ihde's view of mediation of experience. Latour, however, argues that Ihde's post-phenomenology is incompatible with his position, because it consolidates and reaffirms rather than overcomes the subject-object dichotomy. For Latour, it is essential to begin any human-technology interaction research by excluding the presumption of an a priori distinction between human and technological agents. Post-phenomenology, by contrast, accepts this distinction from the first moment onward, but explains that they come into being simultaneously and interdependently. Post-phenomenology does indeed take the two poles as a starting point, but this does not necessarily conflicting with ANT (Verbeek 2005b, p. 166):

> Post-phenomenology and actor-network theory want to do away with the gap between subject and object, but their different perspectives ensure that they do so in different ways… Phenomenology and post-phenomenology bridge the gap rather than denying it, by bringing to light the mutual engagements that constitute subject and object. Their perspectives are focused on the relation between humans and their world and, contra Latour, do not look 'from an externalist perspective' to describe how configurations of humans and nonhumans are continually arising everywhere. And from their perspectives it is indeed meaningful to make a distinction between someone who experiences and something that is experienced, someone who acts and a world in which action takes place – regardless of how interwoven and mutually constituted they are.

Explained in this way, Verbeek combined ANT and post-phenomenology as striving explicitly to develop a theory that distinguishes between artifacts and humans without adopting the subject-object dichotomy. He does this by recognizing the importance of the hermeneutic dimension: humans have perceptions with meaning, artifacts do not.

It is also possible to defend a less phenomenological interpretation of technological mediation, insofar as reality does not arise in the technological mediation between humans and the world. To some degree actions are mediated because our reasons for actions are altered. Put differently, the mediation of perceptions provides a deeper understanding of the mediation of actions. Instead of focusing on how mediation constitutes both subjects and objects at once in realizing themselves in the world, mediation of perception should be explained as the technological alternation of the interpretations that form reasons for people's actions. There is not necessarily reciprocity in the co-constitution of subject and object. As explained in the previous chapters, the primary agenda here is not to overcome the subject-object dichotomy: the main aim is to show how people as moral actors can take responsibility for techno-social factors. For this, we should accept Latour's argument that subjects and objects are not what many ethical studies presume (autonomous rational agents versus neutral tools). But, we do not have to treat subjects and objects symmetrically to the full extent nor do we have to conclude that they mutually co-constitute one another in the strict post-phenomenological sense.

I argue that the mediation of our perceptions (or factual beliefs) should not be seen as an addition to the mediation of our actions: the change of factual beliefs explains why people act in different ways. In other words, the mediation of our factual beliefs provides reasons for our actions on which we can reflect. Factual beliefs are based on technologically mediated perceptions of the world. These perceptions can be direct ("I have seen it myself") or indirect ("the micro-biologist told me …"). Regardless of whether the perceptions are direct or indirect, they are often technologically mediated and so technologies influence those factual beliefs that are part of our reasons for actions.

It goes beyond the scope of this study to discuss in detail the drawbacks of a phenomenological ontology for ethics. But post-phenomenology is limited in only recognizing perceptions based on our experience of phenomena. This restriction results from the argument that subjects and objects are co-constituted simultaneously, which has an important disadvantage.

It is hard to escape one's own perspective in a phenomenological worldview, and consequently, practical ethical reasoning (MacIntyre 2009a) and moral imagination become problematic. If reality – including moral reality – arises in the mutual co-constitution of people and technologies, how is it then possible to take some distance to reflect on the desirability of a situation? How can we be morally imaginative about the social roles of a technology, if our moral reality arises also from the interaction with that technology? Of course, we are not atomistic autonomous beings who can reflect rationally and objectively on the desirability of certain developments. However, as explained in the previous chapter, it is important to work to become more independent and to use one's capacity of practical reasoning and

moral imagination. To it put differently, if objects and subjects are mutually co-constituted, how can we be morally creative? How can we use our capacity of moral imagination in post-phenomenology if theory does not offer many clues on how to adopt an ethical stance?

Post-phenomenology stresses that action and perception are closely linked, but does not pay much attention to the fact that we hold many views that are not co-constituted by action. For example, the idea that we should treat equals equally is not informed by experience. Although it is hard to perform actions that are not based on conscious or unconscious perceptions, actions based on perceptions are a common occurrence. The ideas of logic (A and –A cannot be true at the same time), indirect knowledge (things told by others), and transcendentally formed ideas (metaphysical hypotheses and beliefs about god or gods) are examples of views that inform our actions, but are not formed by them. In other words, the kinds of reasons for action are not experience based. Perception (being a kind of reason or ground) is always primary to action, while many actions do not alter our perceptions at all. This is an important distinction, for two reasons. First, it enables us to address other reasons for actions that may be mediated by technologies (see Sects. 5.3 and 5.4). Second, it creates room for practical reasoning about these reasons, which is essential for taking responsibility (see Sect. 5.5).

Thus, in short, adopting a strict idea of simultaneous co-constitution of perception and action (of object and subject) is where post-phenomenology is deficient. It may be the case that in certain situations "reality arises within the technological mediation between humans and the world". But this is not always the case: Internet could serve as a great example of a technology which mediates shaping and perceiving (virtual) reality simultaneously. Here, Latour's view that for studying techno-social networks a certain kind of realism is required, conflicts with phenomenology.

But regardless of whether one agrees with Verbeek's or the previous arguments, we may conclude that a change in the interpretation of reality can provide new or other reasons for action. Sometimes we will be unconscious about this change (consider for instance the many signs to which we respond automatically), but conscious alterations also take place. A well-studied example is the effect of the microscope on our perceptions of hygiene and diseases (Barnes 2006). When microscopes allowed us to see micro-organisms (microperception), people started to acknowledge the possibility that these tiny "beasts" could be the source of infections. They realized that the solution may lie in avoiding contact with these creatures (macroperception). This understanding changed the view of people on what could be considered safe or healthy and what could not, and consequently they changed their actions regarding hygiene and sanitation. It is not hard to see that the observation of microbes altered the interpretation of causes of diseases, and therefore changed the reasons of people's actions.

Finally, it is also useful to point out that it is not only our perceptions that inform actions: commonly, we have other reasons as well. Technologies do not only mediate perceptions, they also mediate options for actions and moral beliefs (our evaluation of values, norms and virtues). The next two sections explore these two other types of reasons for actions that are technologically mediated.

5.3 What Can We Do? Technological Mediation of Options for Action

Determinists often argue that new technologies restrict our options for actions. Although Latour is definitely not a determinist, many of his examples show that the options for actions are reduced by technologies. A heavy weight on a hotel key makes it less convenient or even impossible to put it in your pocket. A sleeping policeman makes the option of speeding considerably less attractive. An automatic door groom makes it harder to pass through the door with a wheelchair. And perhaps that is why many authors have taken Latour's work as a source of inspiration to plead for deliberately designing moralizing technologies.

Early philosophy of technology often stressed that traditional crafts were highly appreciated in society and were thus rewarding to execute, and that technologies transformed these trades into uninteresting activities performed by unskilled labor. In 1811, the Luddite movement was the first to argue that valuable social tasks disappeared because of new technologies. Their first argument was that the Industrial Revolution threatened their subsistence, but their criticism also had a more fundamental side: they resisted the idea that all labor would become unskilled and mechanical (Jones 2006) and feared that workers would be reduced to slaves of machines. A similar point is made in the 1930s movie *Modern Times,* in which Charlie Chaplin suffers a nervous breakdown from working on an assembly line.

Additional to pointing out mass production and assembly lines in the twentieth century, social pressure became recognized as a reason why new technologies could lead to a limitation of our options in daily life. If everyone is using mobile phones and e-mail to communicate, you cannot reject these technologies, without becoming an outsider and, most probably, unemployed. Furthermore, a new technology can compete and even diminish former options, and therefore some authors argued for a technological evolution theory, for example (Basalla 1988). New technologies replace technologies that are regarded less efficient, less comfortable or less functional, and only the "fittest" technologies survive, according to this view. The case of the zeppelin is a well-known illustration.

Finally, technologies alter our physical adaptation. Edward Tenner analyzes for instance how shoes decrease our options for action by mediating our physical needs (Tenner 2004, p. 53): "People in industrial societies may assume that the tender sole would soon be ravaged by its environment without the protection of footwear. In fact, wearing shoes creates this sensibility." Toward the end of the nineteenth century, it was common for example, for many Irish children living in the countryside to walk to school barefoot. When walking barefoot for a week, protective thickened interstitial tissue forms and the skin becomes horny, protecting the foot from injuries and cold. Wearing shoes every time you step outside makes the tissue perhaps better looking, but also softer and creates the need for protective footwear. In other words, the option for actions become limited: we are no longer able to walk barefoot for many miles if we are used to wearing shoes.

It cannot be denied that options for action disappear because new technologies. Traditional philosophy of technology has provided valuable insights in this regard.

But today, many philosophers of technology understand technologies as means that also increase options for action. Many new technologies – such as wheelchairs, computers and internet – promote new opportunities for people who are less able to participate in society. Due to the mediation of technology, they become more mobile and achieve more means to communicate with other people and as a result alter their views on the good life. For instance, the virtual world *Second Life* also gives disabled people a chance to appear and communicate just like everyone else, overcoming the difficulties of real-life. Photographer Robbie Cooper has created a book in which photographs of real people and their avatars on *Second Life* were published next to each other, accompanied by short interviews (Cooper and Spaight 2007). The book showed that a substantial group had social or physical challenges and used the medium to present themselves in a way that they saw as being more representative of their inner selves. As Cooper and Spaight's research revealed, most players were seduced by the endless possibilities to improve their appearance on the net (see also Chan 2007).

Along with decreasing or increasing our options for actions, technologies also *alter* them. For instance, about a hundred years ago, people had only one way to write a letter to friends or family members living abroad: writing on paper. Today, we often use e-mail to stay in contact, and this alters actions. If the only option you have is to write a letter on paper that will take a long time to arrive and would probably be kept for a long time, you will sit down, reflect and try to do your best to write a beautiful text. E-mail however, is more instant and has the option to respond immediately. We also get so many emails that we delete most of them after some time. So, we tend to write short, quick answers, instead of elaborate letters. If a quick answer is not enough, it is at least polite to let someone know that the message has been received and that a longer answer will follow. The technological option to respond directly is available, and so we are more or less bound to respond quickly. Responding to an e-mail from family or friends is often no burden, but all these new forms of communication are not only used by friends. There are also other settings where the idea that you can respond immediately implies that you ought to act immediately.

So, by changing our options (increasing, decreasing and altering them), technologies mediate our reasons for action: if our options change, our duties can change with them. Often, technologies increase options for action, which encourages people to assign more duties to each other. If there is no medicine or vaccine for a disease such as leprosy, the rich cannot be asked to help cure people in poorer regions. But, with contemporary technologies, it is easy and affordable to fight disease, and the question can be posed as to whether or not it is the duty of the rich to eradicate leprosy.

5.4 What Do We Want? Technological Mediation of Moral Beliefs

Latour extensively explains how human-technology interactions alter the world, but he pays no attention to how technologies alter the way we want the world to be. In other words, he does not explicate the technological mediation of our moral beliefs

(principles, values and virtues). Additional to the perceptions that form our factual beliefs, we have multiple beliefs about how the world ought to be. Moral beliefs are convictions about what is good to be and good to do in relation to the flourishing of oneself, other humans and sensitive beings in general. Based on these moral beliefs, we evaluate options and perceptions. It is often claimed that technologies can have a moral impact in the sense that they influence the quality of life, and the physical and mental well-being of people and other living beings, but theories that explain how technologies alter our understanding of the good life are rare.

How can we understand moral change due to technological developments? One of the rare accounts that addresses the technological mediation of morality is to be found in Swierstra and Rip's article on NEST-ethics (Ethics of New and Emerging Science and Technology). NEST-ethics is inspired by ANT, but offers something extra: it clearly identifies that because of technological change our morality changes, and vice versa (Swierstra and Rip 2007). NEST-ethics was developed for a better design of future scenarios for technology assessments. It rejects the commonly adopted premises of scenario builders that technologies change while morality remains fixed.

Without falling into moral nihilism, NEST-ethics aims to explore which facets of morality are universal and which facets are likely to change over time. Although this is an important step toward understanding the impact of technologies on the moral sphere, Swierstra and Rip explicitly recognize that the next step is to develop a theory of techno-moral change (Swierstra and Rip 2007), p. 19: "An important point, which remained implicit in our discussion of NEST-ethics, is the co-evolution of ethics and new technologies: while there are recurrent patterns of moral argumentation, there is also learning, shifts in repertoires, new issues coming up". During the Expert Seminar *Anticipating the Interaction of Technology and Morality* (2008) Swierstra again signalized that "we lack a theory of techno-moral change."

Here, this need is translated through the question of how technologies can mediate moral beliefs. MacIntyre's notion of practices (1985) can be used as a starting point to show how moral beliefs are technologically mediated. MacIntyre himself makes a connection between practices and technologies when he acknowledges that science and engineering are practices. It is not hard to see why Macintyre makes this claim: Science and engineering are complex, more or less coherent and socially well established multi-actor activities that require special technological skills, values and principles. Furthermore, scientists and engineers are said to strive for moral "excellence". In this pursuit also the production of moral norms is important, as Merton has started to explore (Merton 1973). Merton has identified four norms that scientists have to strive for in their work, knowingly: communality, universality, disinterestedness, organized scepticism. So, the idea that science and engineering are practices in themselves implies that their work is perceptible to moral reflections.

Note that here, the definition of practices is used quite narrowly. In daily language and in many philosophical and sociological writings, the concept is used in a much broader sense, referring to commonly occurring or institutionalized forms of human cooperation. Here, the concept is used in a MacIntyrean sence, though it is not presumed that practices always lead the production of internal goods such as art

or music. MacIntyre's concept of practices can help to make clear what technologies do in relation to the moral sphere. It is important to recall that practices are not opposed to actions: instead, they are a special form of actions, knowing, cooperative actions that are complex but coherent, and in which people need the virtues. Technologies mediate practices, meaning that they alter what we believe to be virtuous and morally right.

There is also another relation between these practices and technologies, which becomes clear when understanding practices as parts of techno-social networks and thus co-shaped by technologies. In discussing practices, MacIntyre focuses exclusively on *humans*, but it is not hard to imagine the mediation of *technologies* in relation to practices. Socially established practices that are low tech are rare, though not imaginary (weddings are a widespread example), but most practices are mediated by technologies, to a larger or lesser degree. Creating art and teaching are just some everyday examples of practices in which technology plays an important role. Their nature has been reestablished due to new technologies. Art societies for instance are often first and foremost defined by their means, such as Montevideo (the Dutch Institute for Media Art), the US Enamellist Society, the Dutch Studio for Electro-Instrumental Music (STEIM), the Ceramic Arts Association of Western Australia and the British Computer Art Society.

Practices are not only organized around technologies: technologies can also mediate existing practices. Consider for instance the role of new technologies in the religious practices with the cell phone Ilkone i800 that is designed to support a Muslim lifestyle. Ilkone is derived from an Arab word meaning "universe". The hardware and software of the Ilkone i800 stimulates the user to pray. The phone has a digital compass that points to Mecca and the phone's alarm rings five times a day when it is time to pray. In this example the Ilkone i800 is far from passive, since it stimulates the user to devout Muslim actions. In other words, the device is mediating religious practice. Furthermore, after the alarm goes off, the phone automatically goes into silent mode for 40 min. This prevents the user and other Muslims from being disturbed during their prayers. Now, one can argue that the Ilkone i800 is designed to stimulate the user's practice of prayer, but as we have seen before, devices that are not designed to fulfill a social role also mediate human actions.

Practices can be technologically mediated in different ways. Existing practices disappear and new practices arise. Innovations can sponsor new practices, for example, the practice of architecture could only arise when a broader range of building technologies was available. Additionally, existing practices, like for instance professional wet-nursing, can disappear when key technologies are replaced by new ones, like artificial baby milk. These mediations are often rather eye-catching and have more to do with the change in options for action than with the change in moral beliefs.

However, practices can also be mediated on a more fundamental level. It is important to realize that practices are not only about what people do, but also about what they believe to be valuable, right or good. It is a mistake that agency is mainly about action, and Latour did not recognize this when he adopted his understanding of agency. He formulated an output oriented definition of agency on the results of

action, on what acts bring about. But, human agency is not primarily about what someone does. Instead, it reminds us that actions flow from our reasons. We act in one way instead of the other because of who we are and what we think. In the practices internal goods are shared (MacIntyre 1985), which implies that by interacting, people develop at least some common moral beliefs. In other words, the values we hold are closely related to the things we do together.

As mentioned earlier, moral beliefs consists of ideas about acting good, which are the values, norms and virtues. Our moral values – for example the value of autonomy, privacy, or trust—are about what we believe to be important for human and environmental flourishing. Moral norms, or rules, explain what to do or what not to do to pursue those values: the Ten Commandments are examples of moral rules. Virtues are about the attitudes or character traits we need to adopt for having and living a good life (or to do the morally desirable thing). Being responsible or trustworthy are examples of virtues.

5.4.1 Values

With the hermeneutical dimension, Verbeek mainly focused on how we interpret the surrounding reality. Of course, this also has consequences for moral actions (Verbeek 2008b), p. 13: "After all, the post-phenomenological approach makes it possible to investigate how technologies help to shape human perceptions and interpretations of reality on the basis of which moral decisions are made." Verbeek explains how ultrasound mediates the relations between fetus and future parents: "it constitutes both in specific ways and therefore it plays a crucial role in moral decision-making."

Verbeek makes an important contribution to the debate: he shows the relationship between our morality and the technological mediation of our perceptions. But morality is not only a matter of how we perceive others. Perceiving others in a different manner (such as observing the fetus with the help of ultrasound) can lead to a change in our reasons for actions (we see how the fetus is moving and developing), but it can also change our moral values. Verbeek's description about perceiving the fetus differently is about our factual beliefs and not about values. In other words, he addresses how ultrasound changes our views on the question: "how 'human-like' is a young fetus?" But he does not go into much detail about how technologies mediate what we believe to be morally valuable (for instance, he does not discuss the question of whether technologies altered our answer to the question "is human life precious?").

Consider two examples of how new technologies (or new applications of technologies) can bring about a shift in moral values. The first example is the change in the values of privacy and security in relation to the cameras placed in public spaces. When in the early 1990s some Dutch city councils decided to install surveillance cameras at train stations, squares and on shopping streets, many people protested that this was a violation of their privacy. Nowadays – only 20 years later – people

are complaining that there are not enough cameras in public spaces to ensure their security, while safety on Dutch streets has not substantially decreased and crime did not increase. People have become used to cameras observing them, and they have gradually come to value the idea that cameras are present to establish safety. Consequently, they have begun to value their privacy less, while valuing safety issues more. Moreover, since early 2010 all passengers boarding at Schiphol and Heathrow on transatlantic flights have submitted themselves to security cameras that can see through clothes, and even this has led to merely a small protest.

In this first example the balance between two opposing values shifts: privacy has become less important in favor of safety. But technologies can also alter the meaning of a value. For instance, the meaning of friendship is altering because of the internet. Thousands of new friendships that are started every day on Hyves and Facebook can hardly be argued as being genuine. Of course, occasionally such a friendship can grow into an enduring closeness, but most of them will quickly subside. If you are bored by someone or if a so-called friend becomes a bit irritating, you can just dismiss him or her with one click of the mouse. There is no stimulus for persevering with this kind of friendships. This is not to say that computer mediated real friendship is not possible at all. Some people meet their partner via the Internet and several authors have pointed out the added value of the Internet for finding and maintaining friendships (see also Briggle 2008). But when acquiring 35 new friends in 1 day, one can say that most of them are not real friendships and few will be enduring, even though personal information is often shared amongst Internet friends.

5.4.2 Norms

Beside values, norms (moral standards for actions) are also mediated by technologies. Technological artifacts are part of practices in the sense that they form, and are formed by, the moral standards of the practice. Innovations can either "sustain" or "transform" the moral standards of practices. An example of "sustaining" is the engineer who develops a hammer drill with the idea that using a hammer drill is typically a male job. The engineer designs a heavy machine with a large handle on the drill, so that it will fit into the large hand of the average construction worker, instead of choosing an alternative that is suitable for smaller hands as well. At that moment, the designer's belief becomes a self-fulfilling prophesy, since the drill will be unsuitable for the average female hand. This way, the drill has become a mediating tool: it "says" drilling can best be done by males and our view on how to divide the tasks is reaffirmed. If we would like to change this, the drill's design should be modified. Comparable examples are the special feminine mobile phones, cars and movies that are increasingly introduced onto the market. These technologies simultaneously recognize and reinforce gender differences.

Frequently, technological developments (for example information technology and television) are associated with the – unintended – global standardization of

habits and viewpoints (Lash and Lury 2007; Levitt 1983). Those viewpoints claim that technologies affect our life world deeply, but the claim is rarely made that technologies alter our moral beliefs.

5.4.3 Virtues

Some philosophers of technology who have argued that our virtues are changed by technological developments, usually understand technology as an all-encompassing system. For instance, Marcuse (Marcuse 1964) has argued that in capitalist societies, technological development creates false desires and people become entangled in the network of production and consumption. According to Marcuse, this results in "one-dimensional" people who lack critical thought. Since we all adapt the same roles of producers and consumers, our lives and characters are becoming superficial. It is about what we have, and no longer about who we are.

Being one-dimensional is also explained as being "morally unimaginative". Günther Anders (Anders 1980/1956) described how technologies may affect our empathy in a macabre way when he discussed the bombing of Hiroshima. To drop a bomb, the pilot only had to press a button and he had to face neither the victims nor the consequences of the bombing. Without hearing or seeing the impact, he was able to kill millions of people, while, as Anders claims, listening to classical music. Due to technology, people become emotionally detached and social coherence declines, Anders argues. But his negative attitude toward technologies faced extensive criticism (Dijk 2000). Technologies such as television–which was often criticized by Anders–and the Internet have increased emotional engagement in many regional, national and international political debates on all kinds of issues. It makes the suffering of people in Third World countries visible and so stimulates empathy.

Pessimistic views like Marcuse's and Anders' do not do full justice to technologies: that is, altering what we believe to be virtuous instead of diminishing virtues. Foucault's description of discipline in schools makes clear that the classroom design and the chairs and desks enforce a certain physical posture for education (Foucault 1975), which encourages a moral posture or attitude. The bodily position is closely linked to the attitude required for learning. Only a few decennia ago, classrooms were designed in such a way that the students were forced to sit up and look at the lecturer or teacher. The rooms and furniture were not designed to stimulate communication, but listening. There was little room to move and only small desks were provided in order to make notes. This design was closely connected to what was then believed to be good education and students' attitudes were expected to be rather "one-dimensional".

Today, complex, multimedia rooms are developed for education in which large, wheeled tables and luxurious office chairs are placed. These surroundings are not only much more comfortable, but they are intended to stimulate a pro-active learning attitude. Students are no longer supposed to sit quietly and listen; they have to work on projects, engage in debates and communicate with others.

The virtuous present-day student is unique, pro-active, assertive, communicative and collaborative, instead of observational, timid, obedient, and solitary. This change in the appreciated virtues of study has been deliberately stimulated by the furnishing. Often, the mediation of our attitude and ideas of the good life have a more emergent character.

The example of the student classes illustrates how technological artifacts mediate our virtues, and it also shows that virtues are not interdependent on each other. Moreover, it points out that there is a close relation between our virtues and actions. The furniture determines the student's ability to adopt a bodily posture (a physical condition) which stimulates the attitude they occupy in relation to each other and to the teacher (which has to do with virtues). As a result, students are encouraged to act in a way that is considered virtuous in the educational practice. Teachers are also stimulated to change their ways. When the furniture of the classrooms is not suitable for cooperation projects (for instance because all of the benches are nailed in rows to the floor), teachers are less likely to provide students with cooperation assignments, for obvious organizational reasons. Also giving long lectures to students seated in a room designed for interactive projects is something most teachers would not choose as it becomes much harder to keep the students attention. Many elderly people often feel there is no coherence in contemporary classrooms, while students often remark that by working in groups their social coherence increases and they are trained to cooperate professionally.

Summarizing, we can say that new technologies, or new applications of existing technologies can alter our values, norms and virtues, or – to be short – our moral beliefs. The previous section discussed how technologies mediate two other types of reasons for actions: our perceptions and our options for action. If the argument is correct so far, what does that mean for the ability of taking responsibility for the mediating role of technologies?

5.5 Again: The Question of Responsibility

The second challenge formulated in Sect. 3.5 was to conceptualize the different forms of technological mediation, so we can come to understand how technologies alter human action on a more detailed level. The argument was that only if we understand technological mediation on a detailed level, can we work to take responsibility for it. If you want to influence the processes successfully, you need to understand the mechanisms of such processes, at least at a minimum level. For this aim, this chapter reformulates Bruno Latour's mediation theory and argues that our actions are technologically mediated because technologies alter the reasons that inform (consciously or unconsciously) our actions. Reasons for actions are commonly divided in three categories: is, can and ought, and technologies mediate all three of these types of reasons.

The mediation of the first category is well explained by Ihde and Verbeek. They argue that technologies mediate our observations and interpretations of the

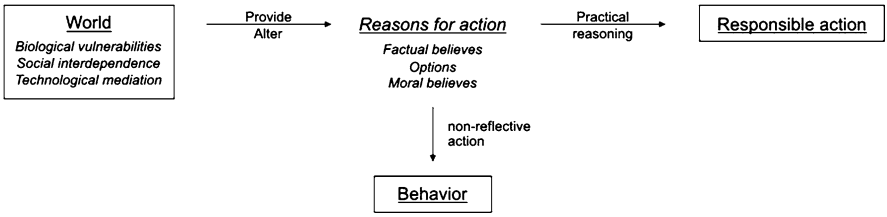

Fig. 5.2 Responsible action in relation to technological mediation

surrounding world. The second category – technologies change the options for action – is explained by addressing the commonplace idea that new technologies offer new possibilities. But as we have seen, technologies can also decrease the options we have or transform the existing options. The third category is introduced with Swierstra and Rip's Nest-ethics, and is explained by examples of how technologies change our moral beliefs.

Summarizing, technologies mediate our views of the factual, the possible, and the desirable. Of course, these three types of reasons are interrelated to each other: sometimes we ought to do something because we can, and often we only can do something because we understand some factual aspects. Furthermore, it is important to stress that we are often not aware of our reasons for actions. We act "a-responsible", and accepting and taking responsibility means aiming or trying to become aware of the reasons for our action, evaluate these reasons and alter our actions according to this evaluation.

For example, while I was writing the sentences above, I appeared to have drunk a large glass of diet coke. I remember the waiter putting the glass on the table, but I am not aware of the fact that I emptied the glass, nor that I was thirsty. So if technologies mediate our reasons for actions, it can simply be the case that we are not aware of it. The bodily position that has to be adopted on a chair is an example of how the chair manipulates your reasons for altering your pose, without demanding much awareness of the average user.

But although we are not aware of all our reasons for action, we can work to take responsibility for our actions by using the capacity of practical reasoning. I can be called a responsible agent, as I am able to reflect about my "diet-coke-drinking" and can decide that it is actually not wise to drink too much coke. The fact that I often tend not to reflect on these kinds of matters, does not mean that I am not able to take responsibility for these kinds of actions. In other words, I am acting non-responsibly when I do not reflect on my eating and drinking habits. Irresponsible behavior is for example drinking too much coke while realizing that it is bad for me. Taking responsibility implies using the capacity of practical reasoning to adjust your actions. Consequently, taking responsibility also implies that you can give a response to the question: why did you do that? See also Fig. 5.2.

Now, as long as technologies do not interfere with the capacities of practical reflection and moral imagination, technological mediation does not in principle, diminish our agency. Technologies such as psycho-pharmaceuticals, deep brain

stimulation and brain implants can change our reasoning, and therefore, it can be questioned whether we can hold someone morally responsible if his actions originate from physical or chemical alteration of his brain (Verbeek 2009). But most technologies do not alter our mental capacity to reflect, and therefore, in principle we are still agents.

So far this study has worked to obtain a general answer to the second challenge. But does that entail that we have a full reply to the question of whether practitioners can take responsibility for the social role of technologies? To be able to take such a forward-looking responsibility, the last challenge still needs to be addressed. Chapter 3 explains that ANT is problematic for responsible action, because the techno-social networks constantly change, which makes is hard to imagine what the possible social role of a technology will be. We have to consider the question of whether we can be imaginative enough to foresee the possible outcomes of technological mediation. This does not require absolute knowledge about future developments (which would be absurd). To take responsibility, we should at least be able to make an educated guess about how new technologies or new application of technologies will mediate the reasons for actions of several involved practices. To do this we should be able and willing to use our moral imagination.

On the question of how to employ the virtue of being morally imaginative, we also stumble upon a second problem. How can we evaluate technological mediation if technologies mediate our moral beliefs? Swierstra and Rip's argument that when reflecting on future techno-social change, morality should not be considered to be a fixed factor (Swierstra and Rip 2007) was adopted for this study. Instead, morality is a variable, which changes when society and technology develops. It is, just like the rest of the network, fluid. As a consequence, one can wonder which norms to use for evaluating possible outcomes. The following chapter works to formulate some preliminary solutions to two problems regarding moral imagination.