Technology and Normativity

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This collection of papers, presented at the biennual SPT meeting at Delft (2005), is devoted to technology and normativity. As such, that is a very broad topic, since various kinds of norms play a role in technology. For instance, with science, technology shares the important role of epistemological norms and values; reliability of knowledge claims is clearly of paramount importance in technology. And in various technological practices, such as architecture, aesthetic norms and values play a dominant role. Epistemological and aesthetic norms and values are not, however, the topic of this special issue. It focuses on the role of moral norms and values in technology (the first part, *Ethics and Technology*), and on the normative aspects associated with functions attributed to technical artefacts (the second part, *Technological functions and normativity*). Prima facie, the role of moral norms and values is related to what engineers ought to do, whereas the normative aspects of functions are related to what technical artefacts ought to do.

The contributions of the first part do not address the role of moral norms and values in technology directly. Instead they centre on a meta-issue, namely how to analyze the role of moral norms and values in technological practices. A main theme in all contributions is how ethics of technology should be practised. What approach should be followed? What may we learn from other areas of applied ethics in this respect? The papers of the second part focus on the normative aspects of technical artefacts, in particular on the normative features related to the notion of function. The functions attributed to technical artefacts form the basis for normative claims about these artefacts, for instance about the proper use of those artefacts or about malfunctioning. How are these normative claims to be understood? To what extent are they, for instance, related to moral norms and values or to the norms and values of practical rationality?

Let us briefly point out a development in ethics and engineering that might bring these two clusters of problems closer together. In recent years the issue of the

moral agency of technical artefacts is attracting more and more attention.[1] Those who argue in favour of some kind of moral agency consider technical artefacts to be inherently normative: technological artifacts are not taken to be simply inert, passive means to be used for realizing practical ends. In other words, technological artifacts are considered to be somehow 'value-laden' (or 'norm-laden'). These moral values and norms may be explicitly designed into these artifacts, or they may be acquired in (social) user practices. If indeed, technical artifacts are normative in a moral sense, then it may be an interesting opportunity for future research to explore any parallels in our interpretations of the moral and non-moral normative aspects of technical artifacts.

Ethics and Technology

Mitcham's opening paper discusses the approach of the Kass council on bioethics in the USA. Although the council has been heavily criticized, Mitcham argues that there are actually a number of things we can learn from the approach chosen by the council. This approach stands out, Mitcham argues, in three respects. First of all, it involves non-specialists, i.e. people from outside the bioethics community. Secondly, it focuses on bigger ethical issues that new technologies raise and does not only carry out piecemeal or specialized analyses. Thirdly, it refers to human nature as a norm. According to Mitcham, these are also three respects in which the ethics of technology can be improved. Also here, philosophy is not only something for specialists but also for the wider public. The second point means, according to Mitcham, that we should be prepared to talk about technology as a whole and not only about individual technologies. Thirdly, also with respect to technology, we should pay attention to nature as a norm. Mitcham admits that the use of the notion of "nature" in ethical discussions is often unclear or confused. He believes however that the solution is not dismissing the term as such but clarifying what people mean with "nature," especially because the feeling that certain technologies contradict human nature seems to be an important moral concern for many people.

The contribution by Asveld compares the approach of "informed consent" for medical and technological practices. Like Mitcham, she uses approaches and developments in another area of applied ethics, in her case medical ethics, as

[1] For instance, it was one of the main topics of discussion at the workshop on New Directions in Understanding Ethics and Technology, University of Virginia, Charlottesville, October 27-30, 2004.

inspiration for the ethics of technology. In medical practices, informed consent is used for dealing with risks of medical treatment or experiments. The principle serves the goal of protecting the autonomy of the patient: if the patient is fully informed about the risk of treatment, the patient has the free choice to undergo the treatment or not. Asveld argues that technological practices differ from medical practices in three relevant aspects when it comes to informed consent. First of all, the aims are different. Whereas medical practices aim at human health, technological practices aim at human welfare. The goal of health is less controversial and more internal to the practice of medicine than the goal of human welfare is to the technological practice. While in medical practises the desirability of the aim of the entire practice can usually be taken for granted, this is not the case in technology. The second difference is the knowledge of risks. According to Asveld, in medical practices knowledge about risks is less contested, partly because the circumstances of use are more predictable. Whereas in medical practices informed consent can be based on more or less consensual knowledge of risks and therefore focuses on their acceptability, in technological practices discussions about the level of risks and their acceptability cannot be separated easily. Finally, the medical practice is - according to Asveld - more exclusive. With this she means that when people enter the medical practice they already have accepted certain fundamental principles underlying that practice; while in technological practises, which are more ubiquitous, this need not be so.

Murata's contribution criticises the professional approach to engineering ethics. He discusses two interpretations of the disaster with the Challenger. The first one, which can be found in many books on engineering ethics, interprets the disaster as a case in which the risk was known in advance and the accident could happen because engineering judgement was overruled unjustifiably by managers. The second interpretation follows Vaughan's book on the Challenger disaster (Vaughan 1996). In this interpretation, the risks of the Challenger were less clear-cut; moreover, the disaster was not caused by managers overruling engineers but was due to the culture at NASA. This culture had resulted in the "normalization of deviance": risks were not longer perceived as such. Murata believes that the second interpretation is much more plausible. According to Murata, to prevent disasters like that of the Challenger, we should not focus on professional responsibility, but on the inherent unpredictability of technology and the civic virtue of engineers. Engineers should be aware of "normal accidents", i.e., accidents due to the normal procedures in an organization for dealing with technologies and their risks. This requires not just organizational measures but a culture in which engineers are sensitive to the unpredictable. It is here that the

notion of "civic virtue" is relevant, i.e. the virtue of caring for others and having regard for their welfare. This virtue is civic and not just professional because it is expected of all citizens.

The contribution by Hansson focuses on safe design. As in Asveld's and Murata's contributions, dealing with the hazards and risks of technology is an important theme in his contribution. The focus is, however, different. Whereas Asveld focuses on the acceptability of technological risks and Murata on organizational and cultural measures for minimizing risks, Hansson focuses on design approaches for minimizing risks and hazards. Hansson argues that engineers have an important responsibility for designing safe technologies. This responsibility, however, extends beyond dealing with risks to dealing with uncertainty. Risk refers to the situation in which there is reliable knowledge of the probability of certain undesirable events. In the case of uncertainty, we lack such knowledge. Hansson argues that strategies for safe design are in fact not only strategies for dealing with risk but also for dealing with uncertainty. For example, adding a safety factor to the strength of a construction not only helps in dealing with known fluctuations in loads or material strengths but can also be effective in dealing with unknown failure modes. It is important to be aware of this: replacing current approaches by approaches that only address risks and not uncertainty may lead to more disasters and be ethically unacceptable.

Technological functions and normativity

The part on technological functions and normativity starts with an analysis by Scheele of the role of social norms in artefact use. The use of technical artefacts is, of course, strongly guided by norms of practical rationality, but Scheele argues that more norms are involved, in particular social standards or norms of conduct. Some of these norms are intimately related to the proper functions of artefacts. He argues that proper functions provide "institutional reasons" for use. Proper use of artefacts, viz. use according to the proper function, is embedded in the normative structures of social institutions. These social normative structures are complementary to traditional norms of practical rationality and are a kind of second-order reasons. He claims that proper functions of artefacts provide institutional reasons, which are up to a certain extent similar to what Raz calls 'exclusionary reasons'. Scheele also observes that institutional reasons may not only give reasons for action, they also provide reasons for evaluating actions. Scheele's analysis presents a deeper insight into how the interplay of norms of

practical rationality and of social norms determines the use of technical artefacts and the evaluation of that use.

The attribution of technical functions to objects has normative implications, but for understanding these implications we need an adequate theory of (technical) functions. In her contribution, Longy addresses a long standing problem with regard to theories of function. It is well known that explaining the (normative) phenomenon of dysfunction (malfunction) has been and still is a real problem for theories of (technical) functions. Because of the phenomenon of dysfunctions it is not possible to simply identify the function to do F with the capacity to do F. But as she rightly observes, we often infer capacities from functions. To solve this problem, she proposes a new theory of functions, of the etiological sort, which is based on a probabilistic relation between having the capacity to do F and having the function to F. This theory, she claims, applies to organisms as well as to artefacts. She argues that the probability of dysfunction may be interpreted in an objective way by distinguishing between considering an object as a physical body and considering it as an artefact. With regard to the object as member of an artefact category, the probability of dysfunction may be taken to be objective because it is causally determined by objective factors. In this way, Longy constructs a probabilistic theory of technical functions that she claims can account for the phenomenon of malfunction.

The normative aspects of technical functions also raise problems with regard to the nature of technological explanations, which is the topic of De Ridder's paper. When designing a technical artifact, engineers are usually able to explain how its function is realized on the basis of its physicochemical properties or capacities. An explanation that purports to explicate this relation between artifact function and structure may be called a technological explanation. There appears to be something peculiar about technological explanations in the sense that a functional property with normative connotations is explained in terms of purely structural (factual) features. De Ridder argues, however, that there is nothing special about technological explanations. He points out that a distinction has to be made between (1) a theory of function ascriptions and (2) an explanation of how a function is realized. The task of the former is to spell out the conditions under which one is justified in ascribing a function to an artifact. A good theory of function ascriptions should account for the normative features of these ascriptions. If that is taken care of by the theory of function ascriptions, then the explanation of technical functions in terms of structures does not pose any special problems. These explanations can pass the buck of normativity to the theory of

function ascription. To substantiate his claim, he discusses a particular theory of function ascriptions that in his opinion does account for the normativity of function ascriptions.

In the final paper of this special issue, Vaesen addresses the question what kind of norms are operative in technological practice and how these norms are to be interpreted. He claims that at least two kinds of normativity may be distinguished in technological practice. One kind of norms concerns what engineers ought to do and the other concerns roughly speaking what artifacts ought to do. This claim is controversial in so far as normativity is associated with technical artifacts. According to the standard approach to normativity, namely normative realism, artifacts are denied any kind of normativity, since normativity applies exclusively to human agents. Only human agent normativity is taken to be a genuine form of normativity. Vaesen argues that normative realism is mistaken on this point. Referring to the work of Daniel Dennett and Philip Pettit he shows that it makes sense to talk about artifactual normativity. He claims that his approach can also make sense of human agent normativity. That is an interesting claim, since it implies, *prima facie*, a unified approach to moral and non-moral forms of normativity.

References

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