Chapter 6
Ethics for the Digital Age: Where Are the Moral Specs?

Value Sensitive Design and Responsible Innovation

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Abstract In the middle of the twentieth century scholars in the social sciences and humanities have reflected on how the telegraph, the telephone and TV have shaped our societies (A good example is the work of Ithiel de Sola Pool in the mid twentieth century. See for example *Politics in Wired Nations, Selected Writings*, Transaction Publishers, London/New York.). In the last 30 years, researchers in a variety of disciplines such as technology assessment, computer ethics, information and library science, science and technology studies and cultural and media studies have conducted research into the way new media, computers and mobile phones have turned a wired society into a full-fledged digital society. In the last 10 years we have entered a new phase of the digital shaping of society. We are trying to come to grips with artificial intelligence, big data, social media, smart phones, robotics, the Internet of Things, apps and bots, self-driving cars, deep learning and brain interfaces. New digital technologies have now given rise to a hyper-connected society. IT is not only getting in between people, but it is also getting under our skin and into our heads—often literally. Our standard ways of keeping tabs on technology by means of information technology assessment, tech policy and regulation, soft law, ethical codes for IT professionals, ethical review boards (ERBs) for computer science research, standards and software maturity models and combinations thereof, are no longer sufficient to lead us to a responsible digital future. Our attempts to shape our technologies are often too late and too slow (e.g. by means of black letter law) or too little or too weak (e.g. codes of conduct). The field of privacy and data protection is an example of both. Data protection lawyers are constantly trying to catch up with the latest in big data analysis, the Internet of things, deep learning and sensor and cloud technology. On any given day, we often find ourselves trying to regulate the technology of tomorrow with legal regimes of yesterday. This gives rise to the question 'How should we make our ethics bear upon high impact and dynamical digital phenomena?'

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6.1 Introduction, or How to Do Ethics of IT Now?

The first thing we need to realize is that the technologies we end up using are consolidated sets of choices that were made in their design, development and implementation. These choices are about e.g. interfaces, infrastructures, algorithms, ontologies, code, protocols, integrity constraints, architectures, governance arrangements, identity management systems, authorization matrices, procedures, regulations, incentive structures, monitoring and inspection and quality control regimes. We build a social world that is shaped by the algorithms that determine how far our messages reach into our networks, what is recommended to us on the basis of what the system has learned about our search history and preferences, what is filtered out and how our reputation is built. We inhabit parametrized life worlds with properties and dynamics that we are mostly unaware of, or that we hardly understand, in case we are aware of them. Digital technology determines how we interact with each other, what we end up seeing and what we end up thinking. The filter bubbles described by Eli Pariser (2011) and Epstein and Robertson's description of Search Engine Manipulation effects (2015) provide examples. The technology that we are using is thus not neutral, since its design is informed by the world views and values of its makers. Once their ideas, values and assumptions have been embedded or expressed in digital artefacts, they start to influence the options, behavior and thinking of users. The digital technologies, our tablets, laptops, and smart phones with their software, apps, user interfaces and default settings form our 'choice architectures' (Thaler and Sunstein 2008) and our 'extended minds' (Clark and Chalmers 1998). The dilemma's and ethical problems we confront are a function of the programs that are running.

Recent thinking about ethics of IT and computer science has therefore focused on how to develop pragmatic methodologies and frameworks that assist us in making moral and ethical values integral parts of research and development and innovation processes at a stage in which they can still make a difference. These approaches seek to broaden the criteria for judging the quality of information technology to include a range of moral and human values and ethical considerations. Moral values and moral considerations are construed as requirements for design. This interest for the ethical design of IT arises at a point in time where we are at a cross roads of two developments: first, "a value turn in engineering design" and on the other hand "a design turn in thinking about values".[1]

First, when the computer was introduced around the middle of the twentieth century, scholarly attention was mainly focused on the technology itself. The computer was developed without too much thought about (1) the use and application in real life, or (2) the social, organizational and political changes it would require to function properly or the impact it would have on society. Computers were a new and fascinating technology: solutions looking for problems. The technology

[1]This draws on my "ICT and Value Sensitive Design", IFIP Int. Fed. For Info. Processing, 233 Nov 2006, DOI 10.1007/978-0-387-72381-5_8

initially appeared to be 'context-free', 'context-independent' and neutral. In the seventies and eighties, attention was increasingly drawn to the context of the technology, i.e. real organizations, (human) user needs and requirements, work conditions, etc. The social and behavioral sciences became increasingly involved with information technology (IT) in the form of (i) human-computer interaction, (ii) participatory design and (iii) social informatics. However, these efforts and commitments were initially mainly focused on a limited set of values, such as user-friendliness and worker-safety. Furthermore, the social and organizational context was often taken into account only as a way to identify potential barriers to the successful implementation of systems and to prevent failed investments. In the first decade of the twenty-first century, the successful application of information technology is increasingly seen as being dependent on its capacity to accommodate human values. Human beings, whether in their role as employers, consumers, citizens, or patients, have moral values, moral preferences and moral ideals. Information technology cannot and ought not to be at odds with them, and preferably should support and express them. In every society, there are ongoing moral and public debates about liability, equality, property, privacy, autonomy and accountability. Successful implementation is more and more construed in terms of how and to what extent values are taken into account in the design and architecture of systems. Values may even become driving factors in the development of IT instead of being an impediment in the design of information technology. We seem to have entered a third phase in the development of IT that we would like to refer to as "The Value Turn in IT", where the needs and values of human users, as citizens, or patients, are considered in their own right and not simply as a side constraint on successful implementation.

Secondly, simultaneous to the development of the views on technology and society, a development in ethics occurred during the course of the last century. From a predominantly meta-ethical enterprise in the beginning of the twentieth century, where the focus was on questions concerning the meaning of ethical terms such as "good" and "ought" and on the cognitive content and truth of moral propositions, the philosophical climate changed in the sixties and ethics witnessed an "Applied Turn". Moral philosophers started to study problems and practices in the professions, issues in public policy and public debate. In the USA, especially, a notable development took place, as philosophers gradually started to realize that philosophy could contribute to social and political debates by clarifying terms and structuring arguments, e.g. concerning the Vietnam War and civil rights, abortion, environmental issues, animal rights, and euthanasia. The focus at this point was on the application of normative ethical theory, utilitarianism or Kantianism, for instance, to practical problems. There often remained a considerable gap with the real world between the prescriptions derived from general theories and the results of the prescriptions in the world of policy making and the professional practice. However, in the last decade, applied ethics has developed into an even more practical discipline as emphasis is now being placed by some authors on the design of institutions, infrastructure and technology, as the shaping factors in our lives and in society.

If ethics wants (to help or to contribute to) real and desirable moral changes in a digital world then digital systems, institutions, infrastructures and applications themselves need to be designed to be demonstrably in accordance with our shared moral values. This design perspective does not only apply to digital technology, but also to other fields of engineering and other sectors in society. Ethicist will have to devote a good part of their attention to design in order to be relevant in the twenty-first century. This notable shift in perspective in practical ethics might be termed "The Design Turn in Applied Ethics" (Van den Hoven et al. 2017).

This has given rise to a different and pragmatic approach to ethics of IT; that goes by different names, but focuses on design and design for values as moral requirements early in the development of new functionality.

6.2 Value Sensitive Design

As a strong proponent of private transport, famous architect and urban planner Robert Moses designed low overpasses on New York parkways, so that cars could easily access e.g. Jones Beach, while at the same time preventing buses to pass under. This turned out to have severe social and political implications, as Langdon Winner (1980) pointed out, as the poor and (mainly) colored population—who are largely dependent on public transport—were prevented from accessing Jones Beach. Indirectly, the overpass functioned as a border-mechanism separating the wealthy from the poor with respect to the area that lies behind. Even if it is still contested whether Moses' design was consciously intended to have the implication of 'natural' or even racial selection as it did, according to Winner it is nevertheless a clear-cut illustration of the political dimensions that artifacts may have. With his account of "The Politics of Artifacts", he was one of the first to point to the political and social ideologies, values and biases our technologies have embedded in them.

Other studies into the philosophy and sociology of technology have also revealed numerous illustrations of the fact that social and political biases and values are incorporated in technical artifacts, systems and infrastructures (see, for example, Cowan 1985; Lansing 1991; Latour 1992; Mumford 1964). The examples in these studies illustrate how technologies tend to promote certain ideologies, while obscuring others. Batya Friedman, Helen Nissenbaum, Jeff Bowker and other scholars in ethics of information technology have extended this research into questions of how information technologies specifically can carry values and contain biases. The presumption here is that technology is not neutral with respect to values. Value-Sensitive Design (VSD) recognizes that the design of technologies bears "directly and systematically on the realization, or suppression, of particular configurations of social, ethical, and political values" (Flanagan et al. 2008).

The idea of making social and moral values central to the design and development of new technology originated at Stanford in the 1970s, where it was a central subject of study in Computer Science. It has now been adopted by many research groups and is often referred to as Value-Sensitive Design (VSD). Various groups in

the world are now working on this theme. Batya Friedman (1997, 2002, 2004) was one of the first to formulate this idea of VSD, others have followed with similar approaches, e.g. 'Values in Design' at University of California (Bowker; Gregory) at Irvine and NYU (Nissenbaum 2001) and 'Values for Design' (Van den Hoven 2007a, b; Brey 2001; Friedman 1999; Friedman et al. 2002; Camp 2003; Flanagan et al. 2005, 2008; van der Hoven and Manders-Huits 2009; van den Hoven et al. 2015).[2]

These approaches share the following features:

First, there is the claim that values can be expressed and embedded in technology. In the way that Moses' racist preferences were expressed in the low hanging overpasses.[3] Values and moral considerations can, through their incorporation in technology, shape the space of action of future users, i.e. they can affect the set of affordances and constraints of users. A road from A to B allows one to drive to B, but not to C. Large concrete walls without doors make it necessary to take a detour. Architects and town planners have known this for quite some time. If values can be imparted to technology and shape the space of actions of human beings, then we need to learn to explicitly and transparently incorporate and express shared values in the things we design and make. And what is more we need to accept accountability for the process to all who are directly or indirectly affected (Fig. 6.1).

Secondly, values and choice made by some will have real effects (often not obvious) on those who are directly or indirectly affected. A good example of how this works can be found in the recent work of Cass Sunstein entitled *Nudge*, which construes the task of applied ethicists and public policy makers as a matter of 'choice architecture' (Thaler and Sunstein 2008; Van den Hoven et al. 2017). Think for example of the person who arranges the food in your university lunch room. That person is your choice architect insofar as he is arranges the things from which you can choose, and by doing so makes some of your choice more likely than others. For example by placing the deep fried stuff almost beyond reach and the healthy fruit and veggies in front, the consumer is invited (not forced) to go for the healthy stuff (the nudge). Speed bumps and the 'fly' in men's urinals are other examples of persuasion and nudging by technology. Digital technologies, in the form of computer interfaces, apps, menu's, webpages, search engines provide paradigm cases of choice architectures that have real impact on how people choose, act and think.

[2]See for an overview (Alina Huldtgren's overview, Design for values in IT) in Van den Hoven, Vermaas and Van de Poel, Springer, 2015). In 2015 an international workshop was held to map out the challenges of Value Sensitive Design in the next decade, see https://www.researchgate.net/publication/283435670_Charting_the_Next_Decade_for_Value_Sensitive_Design

In 2016 A follow up international Lorentz workshop is held https://www.lorentzcenter.nl/lc/web/2016/852/description.php3?wsid=852&venue=Oort

[3]There is some controversy over the true motives of Robert Moses, but Winner's example has become paradigmatic in this context and there are a panoply of examples to the same effect.

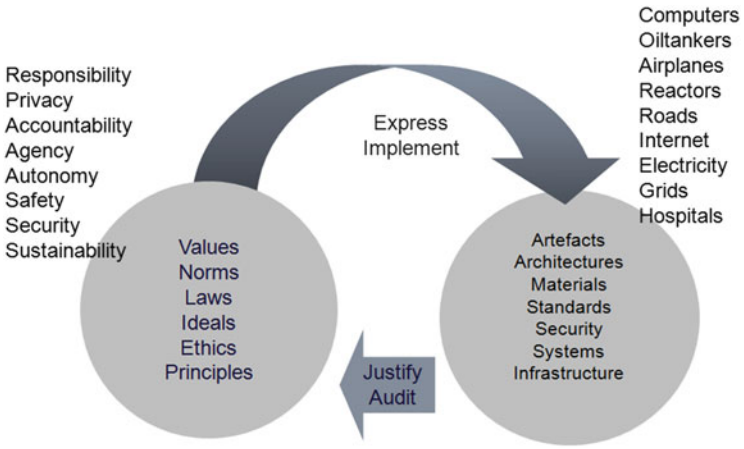

Fig. 6.1 Key problem twenty-first century: value sensitive design

Thirdly, there is the claim that conscious and explicit thinking about the values that are imparted to our inventions is morally significant. Churchill famously observed in front of the House of Commons: "first we shape our dwellings and then our dwellings start to shape us". Technology and innovation are formidable shapers of human lives and society. It is therefore very important to think about what we are doing to ourselves and to each other by means of technology.

A final feature of the value-design approach is that moral considerations need to be articulated early on in the process, at the moment of the design and development, when value considerations can still make a difference. This sounds easier than it in fact is. This desideratum runs into the so-called 'Collingridge dilemma', which states that early in the process of development of a technology, the degrees of freedom for design are significant, but information that could inform design is relatively scarce, while later on in the development of the technology, as information starts to become available, the degrees of freedom in design have diminished.

According to this design approach to ethics of technology ethical analysis and moral deliberation should not be construed as abstract and relatively isolated exercises resulting in considerations situated at a great distance from science and technology, but that instead they should be utilized at the early stages of the research and development. Moreover, they should be construed as non-functional or supra-functional requirements on a par with functional requirements that are used in design. Moral considerations deriving form fundamental moral values (e.g. equity, justice, privacy, security, responsibility) should be decomposed to the point that they can be used alongside other functional requirements to inform design at an early stage. The gradual functional decomposition of supra functional requirements results in the moral specifications (see Fig. 6.2).

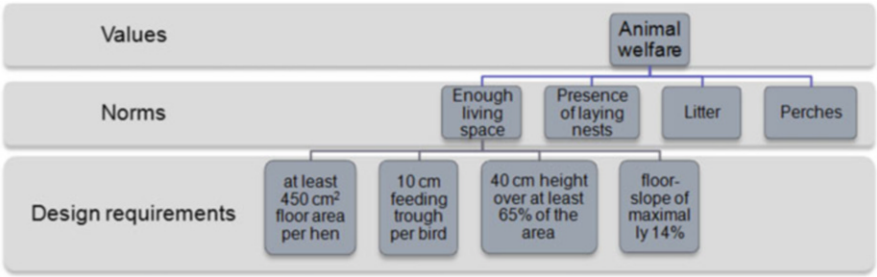

Fig. 6.2 Example of values hierarchy. Courtesy: Ibo van de Poel

6.3 Responsible Innovation[4]

The division of Google concerned with innovations, Google X, has worked on Google Glass which they tested in 2014 and they stopped as a project in 2015. The glasses allowed one to have voice controlled internet access and augmented reality features. Although Google promised not to make face recognition features available for this wearable platform, there were many privacy, safety and security concerns. The idea that large numbers of people would be looking at each other through the lens of a Google device and that people would constantly be checking out things and other people in fairly inconspicuous ways, while surreptitiously taking pictures and capturing data, met with too much public resistance to continue the innovation project. Assuming that Google did not expect upfront to be out of touch with the ethics of society, this seems like an example of an innovation that was discontinued as a result of a failure to deal with the relevant moral considerations.

The Netherlands has learned similar interesting lessons about ethics and digital innovation in the first decade of the twenty-first century. A first instructive case was the attempt to introduce smart electricity meters nationwide. In order to make the electricity grids more efficient and meet the EU CO_2 reduction targets by 2020, every household in The Netherlands would have to be transformed into an intelligent node in the electricity network. Each household could thus provide detailed information about electricity consumption and help electricity companies to predict peaks and learn how to "shave off" the peaks in consumption patterns. After some years of R&D, a plan to equip every Dutch household with a smart meter was proposed to parliament. In the meantime however, opposition to the proposal by privacy groups had gradually increased over the years (AlAbdulkarim and Lukszo 2011). The meter was now seen as a 'spying device' and a threat to the personal sphere of life, because it could take snapshots of electricity consumption every 7 seconds, store data in a database of the electricity companies for data mining, and provide the most wonderful information about what was going on inside the homes

[4]This draws upon my discussion of the relation between Responsible Innovation and Value Sensitive Design in Richard Owen's Responsible Innovation (2013).

of Dutch citizens. With some effort, it could even help to tell which movie someone had been watching on a given night. By the time the proposal was brought to the upper house of the Dutch parliament for approval, public concern about the privacy aspects had become very prominent and the upper house rejected the plan on data protection grounds. The European Commission, being devoted to the development of smart electricity grids in its member states, feared that the Dutch reaction to this type of innovation would set an example for other countries and would jeopardize the EU wide adoption of sustainable and energy saving solutions in an EU market for electricity (Al Abdulkarim and Lukszo 2009).

Another story—not very different from that of the smart meter—is the introduction of a nation-wide electronic patient record system in The Netherlands. After 10 years of R&D and preparations, lobbying, stakeholder consultation and debates—and last but not least an estimated investment of 300 million euros—the proposal was rejected by the upper house in parliament on the basis of privacy and security considerations (Tange 2008; Van Twist 2010).

Clearly these innovations in the electricity system and health care system could have helped The Netherlands to achieve cost reduction, greater efficiency, sustainability goals, and in the case of the electronic Patient Record System, higher levels of patient safety. In both cases, however, privacy considerations were not sufficiently incorporated in the plans so as to make them acceptable. If the engineers had taken privacy more seriously right from the start and if they had made greater efforts to incorporate and express the value of privacy into the architecture at all levels of the system, transparently and demonstrably, then these problems would probably not have arisen.

The important lesson to learn from these cases is that values and moral considerations (i.e. privacy considerations) should have been taken into account as "non-functional requirements" at a very early stage of the development of the system, alongside the functional requirements, e.g. storage capacity, speed, bandwidth, compliance with technical standards and protocols. A real innovative design for an Electronic Patient Record System or a truly smart electricity meter, would thus have anticipated or pre-empted the main moral concerns and accommodated them into its design, reconciling efficiency, privacy, sustainability and safety. Value-sensitive thinking at the early stages of development at least might have helped engineers to do a better job in this respect. There is a range of fine-grained design features that could have been considered and that could have been presented as choices for consumers. A smart meter is not a given, it is to a large extent what we design and make it to be. Respect for privacy can be built in (Garcia and Jacobs 2011; Jawurek et al. 2011). There are several objections against this suggestion. The first is that of moralism, another is that of relativism. Should values be built-in at all and if so which values should be 'built-in' and with which justification? There seem to such a great variety of values. Empirical research even seems to indicate that there is no coherent and stable set of European values, let alone global values. Both objections, it seems, can be addressed satisfactorily. No technology is ever value neutral (Van den Hoven 2012). It is always possible that a particular technology, application or service, favors or accommodates a particular conception of

the good life, at the expense of another, whether this was intended or not. There is therefore virtue in making particular values at play explicit and evaluate how their implementations works out in practice and adjust our thinking accordingly. By being overly impressed in the field of technology by objections of moralism and relativism and as a result abstaining from working with values in an explicit and reflective way, we would run the risk that commercial forces, routine, bad intentions would reign free and infuse technology with values that were not discussed and reflected upon by relevant parties.

Serious attention to moral considerations in design and R&D may not only have good moral outcomes, but may also lead to good economic outcomes. Consider the case of so-called 'privacy enhancing technologies'. The emphasis on data protection and the protection of the personal sphere of life is reflected in demanding EU data protection laws and regulation. The rest of the world has always considered the preoccupation with privacy as a typically European political issue. As a result of the sustained and systematic attention to data protection and privacy, Europe has become an important cradle of new products and services in the field of Privacy by Design or Privacy Enhancing Technologies. Now, the Big Data society is on our doorstep and many computer users—also outside of Europe—are starting to appreciate products and services that can accommodate user preferences and values concerning privacy, security and identity, Europe has a competitive advantage and is turning out to be an important commercial player in this branch of the IT industry.

Innovation can thus take the shape of (engineering) design solutions to situations of moral overload (Van den Hoven et al. 2012). One is morally overloaded when one is burdened by conflicting obligations or conflicting values, which cannot be realized at the same time. But as we saw above, conflicts of privacy and national security seem amenable to resolution by design and innovation in the form of privacy enhancing technologies. Conflicts between economic growth and sustainability were resolved by sustainability technology. Some think of these solutions as mere "technical fixes" and do not construe them as genuine solutions to moral problems. I do not take a stance on this issue here. I just want to point out that in such cases it seems to me that we have an obligation to bring about the required change by design or innovation (Ibidem). The principle that seems to be operative can be formulated as follows: 'If a contingent state of the world at time t1 does not allow us to satisfy two or more of our moral values or moral obligations at the same time, but we can bring about change by innovation in the world at t1 that allows us to satisfy them all together at a later time t2, then we have a moral obligation at t1 to innovate' (Van den Hoven 2013).

This is an important part of what responsibility implies in the context of innovation. It construes innovation as a second order moral obligation: the obligation to bring about a change in the world that allows us to make more of our first order moral obligations (e.g. for security and privacy, for economic growth and sustainability, safety and security) than we could have done without the innovation. Normally, the principle that 'ought' implies 'can' holds, but a noteworthy feature of

this second-order obligation to innovate is that it does not imply 'can'. This means that we may be under the obligation to come up with an innovation that solves our problem, although success is not guaranteed.

It may seem fairly obvious to claim that we have a higher order moral obligation to innovate when it leads to moral progress, but it requires a considerable shift in our thinking about innovation. We need to learn to think—as argued above—of ethical considerations and moral values in terms of requirements in design and research and development at an early stage. Value discourse should therefore not be left on an abstract level, but needs to be operationalized or 'functionally decomposed', as is often done with high level and abstract requirements in engineering and design work. The process of functional decomposition eventually leads to a level of detail that points to quite specific design features of the system, the 'moral specs'. This requires engineers to be value-focused in their thinking and capable of articulating the values at play with different stakeholders (Pommeranz 2012).

If some innovative organization or process would be praised in virtue of its being "responsible", this would imply, among other things, that those who initiated it and were involved in it must have been accommodated as moral and responsible agents, i.e. they must have been enabled:

(A) To obtain—as much was possible—the relevant knowledge on (I) the consequences of the outcomes of their actions and on (II) the range of options open to them and
(B) To evaluate both outcomes and options effectively in terms of relevant moral values (including, but not limited to wellbeing, justice, equality, privacy, autonomy, safety, security, sustainability, accountability, democracy and efficiency).

In light of (I) and (II) above, I suggest that another implication of the notion of Responsible Innovation is the capability of relevant moral agents

(C) To use these considerations (under A and B) as requirements for design and development of new technology, products and services leading to moral improvement.

On the basis of this characterization of innovation and the implications (A), (B) and (C) we may characterize Responsible Innovation in summary as follows:

(III) Responsible Innovation is an activity or process which may give rise to previously unknown designs either pertaining to the physical world (e.g. designs of buildings and infrastructure), the conceptual world (e.g. conceptual frameworks, mathematics, logic, theory, software), the institutional world (social and legal institutions, procedures and organization) or combinations of these, which—when implemented—expand the set of relevant feasible options regarding solving a set of moral problems.

6.4 Conclusion

If were given a choice we would prefer a situation where only those digital technologies would gain social acceptance that were morally acceptable. We would prefer a situation where technologies deemed morally unacceptable would also not be socially accepted and gain currency for precisely that reason. In order to bring about this ideal situation, it would be helpful if the digital products and services, our systems and software, could be made to wear the index of moral acceptability on their sleeves and could be made in such a way that they send honest signals to users about their moral quality and the values that have been used to shape them. In order to achieve this level of accountability and transparency Ethics of IT in the twenty-first century will have to be developed along design lines sketched out here.

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