Introduction

All successful technologies change our lives. Up until the last fifteen years, cars had changed things more than computers had. Mainframe computers by then had changed administration and management, production in corporations, and scientific research, but they had a minimal effect on everyday life. It was really only with the advent of the World Wide Web and the incorporation of computer chips in many common appliances that the lives of most people were changed by computer technology. One of the most important features of information technology (IT) today is its ubiquity. This ubiquity is a result of what James Moor calls *the logical malleability* of computers. Computers can be programmed to do a large variety of different things; route information packets on the Internet, simulate hurricanes, make music, and instruct robots. They can be adapted to many different devices and put to many different uses. They allow us to work online, shop online, relax by playing computer games interactively with people from all over the world, get our news, study for our degrees, and find most of the information that we require.

The technology has not only changed what we do, but also how we do it. E-mail, chat rooms, blogs, and other forms of computer-mediated communication have altered how we communicate, and with whom we communicate and interact. It has changed how we relate to each other and how we experience our relations with others.

Information technology has also prompted us to revisit some important concepts and questions in moral philosophy, a number of which are discussed in this volume. As long ago as 1978, the impact of computers on philosophy in general was discussed by Aaron Sloman (1978), and more recently by Bynum and Moor (1998). The emphasis in this volume is not on philosophical concepts in general but rather on key concepts of moral philosophy: justice and equality, privacy, property, agency, collective action, democracy, public sphere, trust, esteem. The notions of property and theft, for example, particularly in the guises of intellectual property and copying,

arise in ways that they have not before with the ease of making multiple copies identical with the original at zero cost and the ease of transmitting those copies to large numbers of people. The notions of sharing and fair use even seem to be less clear in peer-to-peer contexts. For example, where sharing with friends might once have involved lending a book to three or four people, sharing now involves sending a file to hundreds or thousands of acquaintances in a file-sharing network. With whom does the responsibility lie when illegal or unjustifiable copying does take place?

Aspects of democracy are being examined afresh because of the influence of the Internet. Does the Internet give rise to a new public sphere that is not bound by geography? Does the freedom to select information lead to a situation where individuals forego opportunities to expose themselves to multiple and critical points of view? Is information gained from the blogosphere reliable compared to information and opinions gained from the traditional media? Because all of these issues bear on democracy in new ways, a reassessment of the conditions for democracy seems required.

The online world also poses problems, for example, concerning personal identity, personal relationships, friendship, privacy, trust, and esteem, that have not arisen previously. Who or what does it mean to be 'a person online,' or to have a real friendship online, and, can there be trust and esteem in this ephemeral electronic environment? Cocking, Matthews, Pettit, and Brennan examine these issues. Before the advent of the Internet, such discussions would not have been possible, except perhaps as thought experiments.

The Internet may also give a boost to the quest for a global ethics. Are conflicts between different cultures and value systems worldwide brought to the fore because of connectedness among the peoples of the world, or, does the technological link establish a platform for common practices that increases chances of finding interesting modes of conviviality?

Computers too have had an impact on discussions of moral responsibility. Can machines, in the form of computers, be morally responsible? How does computer use affect the moral responsibility of the humans using them? The vast increase in information, and its easy access by many via the Internet, has changed the landscape somewhat with respect to applications of theories of distributive justice. The advent of ubiquitous IT has not only led to a re-examination of various ethical notions, it has brought about discussions that suggest that new approaches to ethics are necessary.

The previous discussion demonstrates the impact that information technology has had on moral philosophy, but the impact can and should go the other way as well, that is, moral philosophy should also have an impact on the design and development of IT. A careful analysis of key concepts, for example, privacy, can lead to more careful, adequate, and responsible design of computer systems, particularly if we believe that moral values should play a part at the design stage. At a more general level, these philosophical analyses

inform the types of systems that are designed and developed, and even perhaps influence the kind of research that is undertaken that enables particular systems to be developed at all.

Chapter 1 is by Terry Bynum, who first brought the importance of Norbert Wiener to the attention of those interested in the ethics of information technology. He shows how, as early as the 1940s, Wiener recognised the power and potential of automation and potential ethical and social problems. These ethical and social impacts were explored by Wiener against the background of his conceptions of human purpose and the good life, and, more specifically, with reference to his principles of freedom, equality, and benevolence. Bynum goes on to describe the metaphysics underlying Wiener's views and considers how they are similar to, in some respects, the positions of both Moor and Floridi, who describe their views in the chapters that follow.

In Chapter 2, Moor argues that with the rapid developments in technology, particularly in genetics, neuroscience, and nanotechnology, a new approach to ethics is required. He argues that the 'logical malleability' of computers led to so-called policy vacuums that require careful ethical analysis to fill, and extends this idea to the malleability of life (genetic technology), of material (nanotechnology), and of mind (neurotechnology). This, in turn, leads to policy vacuums in these new areas, which, Moor argues, require a new approach to ethics. The tripartite approach that he outlines involves first, seeing ethics as ongoing and dynamic and not just something to be done after the technology has been developed; second, as requiring much more collaboration between ethicists, scientists, and others; and third, as requiring a more sophisticated ethical analysis.

Information ethics, or as it is commonly called, computer ethics, has normally been seen, Floridi argues, as a microethics. He believes that this is a mistake and too restrictive. In Chapter 3, he develops information ethics as a macroethics, a form of environmental ethics that extends current environmental ethics from applying to living things to all informational objects, that is, to everything. All informational objects have at least minimal, and overridable, ethical value, and, hence, can be ethical patients. Nonhumans, including animals and computer systems, can also be ethical agents once the notion of moral responsibility is divorced from that of moral agency. Floridi's four fundamental principles of information ethics are: (1) entropy ought not to be caused in the infosphere; (2) entropy ought to be prevented in the infosphere; (3) entropy ought to be removed from the infosphere; and (4) the flourishing of informational entities, as well as the whole infosphere, ought to be promoted by preserving, cultivating, and enriching their properties.

Chapters 4–11 are all in some way related to the Internet, and Chapters 4–6 of these are concerned with democracy. Chapter 4, by Bohman, examines the idea that the Internet can be, or is, a facilitator of democracy, including

transnational democracy. His aim in the chapter is to defend the view that democratising publics can form on the Internet, a technology that has features relevantly different from previous technologies, such as many-to-many communication. He begins by analysing new forms of political authority and public spheres, moves on to institutionalised authority, and, finally, develops the contribution made by transnational public spheres to the democratisation of international society. Sunstein (Chapter 5) is also interested in the Internet and democracy, but from a different point of view. His concern is the ability that the Internet gives to people to determine in advance what they view, what sort of information they can get, and with whom they interact. Although this has beneficial aspects, in increasing choice, for example, it also restricts a person's variety of information, thereby limiting exposure to contrary points of view, and it limits the number of common experiences that citizens have. Sunstein demonstrates the importance of both of these for a well-functioning democracy. Chapter 6 again concerns democracy and the Internet, but this time in relation to the reliability of the knowledge or information gained from blogs, as opposed to the conventional media. Goldman is interested primarily in epistemic conceptions of democracy, where democracy is seen as the best system for 'tracking the truth'. The central question that Goldman examines is whether the Internet is a more or less reliable source of information than the conventional media, for purposes of public political knowledge.

Chapters 7–10 are Internet-related chapters that are all concerned with online relationships. In Chapter 7, Cocking's primary interest is the extent to which people can have rich relationships and true friendships through computer-mediated communication only. His argument that this is probably not possible is based on an examination of normal offline communication and relationships, particularly with regard to how we present ourselves to others. Online we have much greater control of our self-presentation, at least in text-only communication, and this restricts in significant ways our relationships and interactions with each other. In Chapter 8, Matthews is also interested in relationships and how these are, or might be, affected by information technology. His focus however is on personal identity. Identity, in the sense of character, is a result partly of our relationships with others, especially close relationships, and he explores how two applications of information technology, computer-mediated communication and cyborgs, can affect those relationships and, thereby, our identities. He emphasises normative aspects of identity and suggests ways that these should influence information technology design.

Trust is an important aspect of relationships and also, more generally, for society. In Chapter 9, Pettit argues that trust, as opposed to mere reliance, is not possible between real people whose only contact is through the Internet, given the Internet as it currently exists. He distinguishes two types of trust: *primary trust*, based on loyalty, virtue and so on, and *secondary trust*, which

is based on the fact that humans savour esteem. The Internet is not an environment in which enough information can be provided to justify a belief in someone's loyalty and so on, and it cannot show that someone is being held in esteem by being trusted. On the Internet, we all wear the Ring of Gyges. Chapter 10 considers further the idea of esteem on the Internet. Brennan and Pettit assume, reasonably, that people in general have a desire for the esteem of others and a related desire for a good reputation. They argue that, even though people may have different e-identities online, it does not follow that a good e-reputation is not desired and is not possible. Their case involves a careful examination of pseudonyms and anonymity, and they argue that people can and do really care about their virtual reputations.

In Chapter 11, Charles Ess explores the possibility of a global ethics for this global network. Two pitfalls that must be avoided are the extremes of ethical dogmatism on the one hand and ethical relativism on the other. Those who maintain that there are universal ethical values are in danger of the first extreme, and those who resist that view must be wary of the second extreme. Ess argues for ethical pluralism, the view that while there are relevant moral differences between cultures, when seen in a broader context can be seen to be different interpretations of fairly generally held values that could form the basis of a global ethics. He illustrates his argument with examples from different Eastern and Western traditions, which, at least superficially, appear to have very different moral values.

Responsibility has long been a central topic in ethics and IT, where the focus is on the responsibilities of computing professionals and on who can or should be held responsible for computer malfunctions. In Chapter 12, Miller examines a different aspect, the notion of collective responsibility in relation to knowledge acquisition and dissemination by means of information and communication technology. He argues that the storage, communication, and retrieval of knowledge by means of information and communication technology (ICT) can be considered a joint action in this context. This allows him to apply his account of collective moral responsibility to the ICT case. The relevant human players, systems designers, and software engineers, for example, and not the computers, have collective moral responsibility for any epistemic outcomes. Given that there is now discussion of whether or not computers can be morally responsible, this is a nontrivial result. Moral responsibility, which bears on this last point, also arises in Chapter 13, but in a very different way. Johnson and Powers are concerned with the moral agency of computer systems, and compare such systems with human surrogate agents, arguing that, while there are differences, the similarities are substantial. Their argument is that these systems can be considered moral agents, but the question of whether or not they, that is, the computer systems, could also have moral responsibility is left open.

Chapters 14 and 15 cover topics that have always been central to computer ethics – intellectual property and privacy. In Chapter 14, Wendy Gordon

gives a detailed analysis of intellectual property concerns from both consequentialist and deontological perspectives, using a recent court decision in the United States as a case study. The central issue in this case was the extent to which a provider of technology should be held responsible for the uses to which that technology should be put, in this case, the infringement of copyright. An important feature of the argument of this chapter is the analysis of the ways in which information and communication technologies bear on the legal and ethical issues of property and copying. The thrust of the argument is that unauthorized copying the work of others in the digital context is not necessarily wrong, from either consequentialist or from deontological (in this case, Lockean) perspectives.

The issue of privacy is commonly raised in the context of the use of various technologies. In Chapter 15, van den Hoven construes the privacy debates as discussions about different moral grounds used to protect personal data. The strongest and most important grounds, prevention of harm, fairness, and nondiscrimination, can be shared among advocates of a liberal conception of the self and its identity and individual rights as well as opponents of such a view. Only if we make this distinction will be able to overcome the privacy problems in the context of concrete policy and technology decisions.

Chapter 16, by Flanagan, Howe, and Nissenbaum, however, explores taking these and other values into account in the design and development stages of the software – a more proactive approach. Technology is not neutral, on their account, and values can be embodied within it. They develop their argument around a case study, a computer game designed to teach girls computer programming skills. Their conclusion is not only that values can be designed into software (their study suggests ways of achieving this), but that designers have a duty to take moral values into account when designing computer programs.

In Chapter 17, Elgesem consider the question of whether, and under what circumstance, it might be legitimate to proscribe research, using research in information technology as an example. He argues that such proscription is justifiable only in cases where there is harm to identifiable individuals. Although he concedes that there is no sharp distinction between pure and applied research, there is, nevertheless, a useful distinction and that, in the latter case, it is more likely that identifiable individuals might be harmed. Therefore, it will be easier to justify proscription of applied research than pure research, which should rarely or never be stopped by governments.

Since the expansion of the Internet and especially the World Wide Web, there has been much discussion of the so-called digital divide; the divide between those with access and those without. In Chapter 18, van den Hoven and Rooksby develop a normative analysis of informational inequalities, and argue that information is a Rawlsian primary good. This Rawlsian framework enables them both to spell out criteria for the just distribution of access to information and to give a theoretical basis to the claim that the digital divide ought to be bridged.

In conclusion, information technology, as it has developed over the past couple of decades, has considerably altered our lives and experiences. This is especially true since the advent of the Internet and home computers. However, apart from changing lives, it has also has provided food for thought for moral philosophy and for philosophy more generally. Old philosophical and conceptual categories and concepts require review and old problems arise in novel ways. Some of the challenges facing philosophers are addressed in this book.

References

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Norbert Wiener and the Rise of Information Ethics

Terrell Ward Bynum

> To live effectively is to live with adequate information. Thus, communication and control belong to the essence of man's inner life, even as they belong to his life in society.
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> *Norbert Wiener*

SCIENCE, TECHNOLOGY, AND ETHICS

Major scientific and technological innovations often have profound social and ethical effects. For example, in Europe during the sixteenth and seventeenth centuries, Copernicus, Newton, and other scientists developed a powerful new model of the universe. This stunning scientific achievement led to increased respect for science and for the power of human reasoning. During that same era, recently invented printing-press technology made it possible to spread knowledge far and wide across Europe, instead of leaving it, as before, in the hands of a privileged minority of scholars. Inspired by these scientific and technological achievements, philosophers, such as Hobbes, Locke, and Rousseau, re-examined human nature and the idea of a good society. They viewed human beings as *rational agents* capable of thinking for themselves and acquiring knowledge through science and books. In addition, they interpreted society as a creation of informed, rational citizens working together through *social contracts*. These philosophical developments laid foundations for ethical theories such as those of Bentham and Kant, and for political changes such as the American Revolution and the French Revolution.[1]

Today, after far-reaching scientific achievements in physics, biology, and cybernetics – and after recent technological advances in digital computing

[1] The social, political, scientific, and technological developments mentioned here were much more complex than this brief paragraph indicates. There is no intention here to defend any form of technological determinism. For a helpful, relevant discussion, see Gorniak-Kocikowska (1996).

and information networks – philosophers are again rethinking the nature of human beings and of society. A pioneer in these philosophical developments was Norbert Wiener (1894–1964), who founded information ethics as a field of academic research in the 1940s. Wiener was a child prodigy who graduated from high school at age eleven and earned an undergraduate degree in mathematics at age fifteen (Tufts 1909). His graduate studies were in biology at Harvard (1909–1910), in philosophy at Cornell (1910–1911), and at Harvard (1911–1914), where he studied philosophy of science with Josiah Royce. At age eighteen, Wiener received a Harvard PhD in mathematical logic and then went to Cambridge University in England for postdoctoral studies with philosopher Bertrand Russell.

THE BIRTH OF INFORMATION ETHICS

Wiener's creation of the field of information ethics was an unexpected by-product of a weapons-development effort in World War II. In the early 1940s, while he was a mathematics faculty member at MIT, Wiener joined with other scientists and engineers to design a new kind of antiaircraft cannon. Warplanes had become so fast and agile that the human eye and hand were much less effective at shooting them down. Wiener and his colleagues decided that an appropriate cannon should be able to 'perceive' a plane, calculate its likely trajectory, and then decide where to aim the gun and when to fire the shell. These decisions were to be carried out by the cannon itself, and part of the cannon had to 'talk' with another part without human intervention. The new gun, therefore, would be able to

1. Gather information about the external world,
2. Derive logical conclusions from that information,
3. Decide what to do, and then
4. Carry out the decision.

To create such a machine, Wiener and his colleagues developed a new branch of science which Wiener named *cybernetics*, from the Greek word for the steersman or pilot of a ship. He defined cybernetics as the science of information feedback systems and the statistical study of communications. In the midst of these wartime efforts, he realized that cybernetics, when combined with the new digital computers that he had just helped to invent, would have enormous social and ethical implications:

> It has long been clear to me that the modern ultra-rapid computing machine was in principle an ideal central nervous system to an apparatus for automatic control; and that its input and output need not be in the form of numbers or diagrams but might very well be, respectively, the readings of artificial sense organs, such as photoelectric cells or thermometers, and the performance of motors or solenoids. . . . Long before Nagasaki and the public awareness of the atomic bomb, it had occurred to me that

we were here in the presence of another social potentiality of unheard-of importance for good and for evil. (Wiener 1948, p. 36)

During the War, Wiener met often with computing engineers and theorists, such as Claude Shannon and John von Neumann. He collaborated regularly with physiologist Arturo Rosenblueth and logician Walter Pitts, who had been a student of philosopher Rudolph Carnap. Near the end of the War, and immediately afterwards, this circle of thinkers was joined by psychologists, sociologists, anthropologists, economists, and a philosopher of science. Wiener and his collaborators had come to believe 'that a better understanding of man and society . . . is offered by this new field' (Wiener 1948, p. 39).

Shortly after the War, in 1948, Wiener published *Cybernetics: or Control and Communication in the Animal and the Machine*. In that book, he explained some key ideas about cybernetics and computing machines, and he explored the implications for physiology, medicine, psychology, and social theory. A few passages included comments on ethics, such as the above-quoted remark about 'good and evil' – comments that aroused the interest of many readers. Wiener was encouraged to write a follow-up book focusing primarily upon ethics, and so in 1950 he published *The Human Use of Human Beings: Cybernetics and Society* (revised and reprinted in 1954), in which he said this:

That we shall have to change many details of our mode of life in the face of the new machines is certain; but these machines are secondary in all matters of value . . . to the proper evaluation of human beings for their own sake. . . . (Wiener 1950, p. 2)

Wiener devoted his book to the task of educating people about possible harms and future benefits that might result from computing and communications technologies.

In the book, *The Human Use of Human Beings*, Wiener laid philosophical foundations for the scholarly field that today is variously called 'computer ethics' or 'ICT ethics' or 'information ethics'. In this chapter, the term 'information ethics' has been selected, because Wiener's analyses can be applied to many different means of storing, processing, and transmitting information, including, for example, animal perception and memory, human thinking, telephones, telegraph, radio, television, photography, computers, information networks, and so on. (The field of 'computer ethics' is viewed here as a subfield of information ethics.)

CYBERNETICS AND HUMAN NATURE

According to Wiener, 'we must know as scientists what man's nature is and what his built-in purposes are' (Wiener 1954, p. 182). In *The Human Use of Human Beings*, he provided a cybernetic account of human nature that is, in many ways, reminiscent of Aristotle (see Bynum 1986). For example,