

ORIGINAL ARTICLE

Technology ethics assessment: Politicising the 'Socratic approach'

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Abstract

That technologies may raise ethical issues is now widely recognised. The 'responsible innovation' literature – as well as, to a lesser extent, the applied ethics and bioethics literature – has responded to the need for ethical reflection on technologies by developing a number of tools and approaches to facilitate such reflection. Some of these instruments consist of lists of questions that people are encouraged to ask about technologies – a methodology known as the 'Socratic approach'. However, to date, these instruments have often not adequately acknowledged various political impacts of technologies, which are, I suggest, essential to a proper account of the ethical issues they raise. New technologies can make some people richer and some people poorer, empower some and disempower others, have dramatic implications for relationships between different social groups and impact on social understandings and experiences that are central to the lives, and narratives, of denizens of technological societies. The distinctive contribution of this paper, then, is to offer a revised and updated version of the Socratic approach that highlights the political, as well as the more traditionally ethical, issues raised by the development of new technologies.

KEYWORDS

business, ethics, politics, power, responsible innovation, Socratic approaches, technology

1 | INTRODUCTION

That technologies may raise ethical issues is now widely recognised (Brey, 2012; Jasanoff, 2016; Jonas, 1973; Moor, 2005). The 'responsible innovation' literature – as well as, to a lesser extent, the applied ethics and bioethics literature – has responded to the need for ethical reflection on technologies by developing a number of tools and approaches to facilitate such reflection. Some of these instruments consist of lists of questions that people are encouraged to ask about technologies in order to provoke them to think more deeply about the technology – a methodology known as the 'Socratic approach'. However, to date, these instruments have often not adequately

acknowledged various political impacts of technologies, which are, I shall suggest, essential to a proper account of the ethical issues they raise. New technologies can make some people richer and some people poorer, empower some and disempower others, have dramatic implications for relationships between different social groups and impact on social understandings and experiences that are central to the lives, and narratives, of denizens of technological societies. Businesses considering developing or adopting new technologies must reckon with these ethical and political issues if they are to do the right thing and also if they wish to minimise the commercial risks associated with involvement in unethical outcomes and/or practices. The distinctive contribution of this paper, then, is to offer a revised

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and updated version of the Socratic approach that highlights the political, as well as the more traditionally ethical, issues raised by the development of new technologies. The paper advances the literature by enumerating and justifying a list of questions that is also significantly more comprehensive in scope than any existing account of which I am aware. The ultimate measure of my approach will be whether it identifies or reveals ethical issues that might have been missed by those applying alternative tools.

The structure of the paper is as follows. In section 2, I briefly gloss the current state of the literature regarding what is required to respond to the ethical challenges posed by technologies and motivate my own contribution to the literature on Socratic approaches by arguing that existing Socratic approaches suffer from a number of deficits – in particular, from a failure to sufficiently interrogate the political implications of technologies. Section 3 explains how the Socratic ‘ethics interrogation’ set out in section 4 of the paper is intended to be used in practice. Section 4, the majority of the paper, then sets out an extensive list of questions, which, I hold, should be asked about new – or existing – technologies. Finally, in the conclusion, section 5, I provide some suggestions as to how answering these questions might inform efforts to render technologies ‘more ethical’.

2 | TECHNOLOGY ETHICS TO DATE AND THE CASE FOR A POLITICAL APPROACH

Understanding the ethical issues raised by existing technologies and anticipating those likely to be raised by new technologies is essential to good public policy. Addressing these issues is especially important for those technologies – such as AI – that are touted as ‘revolutionary’ because, as the rhetoric of revolution makes clear, the potential of these technologies to radically alter social, economic and political relationships between denizens of technological societies suggests that decisions about them should be made openly and democratically (Moor, 2005; Sparrow, 2008). Understanding the ethical issues raised by a particular technology is also essential to developing commercially successful technologies, especially now that the Internet makes it possible for ‘exposes’ of ethical problems to go ‘viral’ (Whittle et al., 2019).

A 2018 survey of methods of practising ethics in research and innovation identified 35 different approaches to technology ethics across different fields (Reijers et al., 2018). The large number of different approaches renders it impossible to critically evaluate them all in an article length treatment.¹ However, for the purposes of my discussion here, it is worth highlighting four different, although not necessarily entirely exclusive, sorts of approaches to identifying ethical issues raised by new technologies, and their advantages and disadvantages, which together constitute most of – even if they do not exhaust – the field: lists of ethical principles, ethics checklists, stakeholder approaches and ‘Socratic’ approaches. Lists of ethical principles foreground the inevitable trade-offs involved in attempts to render technologies ethical but are usually at too high a level of abstraction to

provide much guidance in concrete cases (Hagendorff, 2020; Madaio et al., 2020; Mittelstadt, 2019; Whittlestone et al., 2019). Ethics checklists aim to provide such guidance by allowing interested parties to ‘tick off’ whether each of a number of ethical issues has been dealt with, or at least considered, but either also suffer from the problem of being over-general or need to be developed anew each time one wants to consider a different technology (Brey, 2012; Kiran et al., 2015, p. 6; Palm & Hansson, 2006; van Gorp, 2009). Stakeholder approaches (Deblonde et al., 2007; Friedman et al., 2008; Kluver et al., 2000; Van der Velden & Mörtberg, 2015) address the democratic deficit implicit in any one individual (or group) presuming to determine whether or not a technology is ethical but are vulnerable to distortions introduced by power relationships amongst stakeholders and to the contingencies of the unfolding of particular deliberative exercises (Bjerknes & Bratteteig, 1995; Genus & Coles, 2005; Goodin, 2000, pp. 88–89; van Lente et al., 2017; Van Oudheusden, 2014). Socratic approaches (Hofmann, 2005; Hofmann et al., 2014; Marx, 1998; Postman, 1999; van Gorp, 2009; Wright, 2011), which are my particular focus here, require designers and/or policy makers to answer various questions in order to encourage them to think more deeply about the ethical issues raised by a technology: Such approaches excel at revealing the range of ethical questions that particular new technologies may raise but need to be supplemented by lists of principles and/or stakeholder approaches when it comes to the relative weights of different ethical considerations.

One challenge for any approach to the ethics of technologies is to respond adequately to the *political* aspects of technologies – to the ways in which technologies benefit some while harming others, alter relationships between people, and reshape social meanings and experiences in ways that empower some while disempowering others. The political nature of technologies has received renewed attention in recent debates about the ethics of AI, which have highlighted, in particular, the way that technologies interact with existing inequalities and the legacy of historical injustices to reproduce and exacerbate inequality (Eubanks, 2018; O’Neil, 2016; West et al., 2019). As a number of participants in these debates have observed, arguments about ethics can risk depoliticising discussions about new technologies by implying that there is one set of (mostly) ‘philosophical’ issues that ‘we’ (all) face and obscuring the trade-offs – and real conflicts of interest – involved in the design and application of technologies (Crawford et al., 2019; Mittelstadt, 2019).²

Of the approaches I have highlighted, the stakeholder approach is most obviously suited to meeting this challenge, presuming as it does that different parties might be differently impacted by technologies and have different attitudes towards them (Bjerknes & Bratteteig, 1995; Van der Velden & Mörtberg, 2015). However, prior to a full consideration of the impacts of a technology, it can be hard to identify all the stakeholders let alone involve them in discussions about the technology (Manders-Huits, 2011, pp. 277–278). Moreover, even when we can identify stakeholders, there is no guarantee that discussions between stakeholders will range widely enough that we may be confident that they have surveyed all the ethical issues a technology might raise.

Socratic approaches also have significant potential when it comes to recognising the political aspects of new technologies insofar as it is possible to include questions about the political implications of new technologies in the list of questions that should be asked about them. However, to date, I believe that Socratic approaches have failed to adequately take into account the full range of political issues that may be raised by technologies.

This is not to deny that the authors of Socratic approaches have been *conscious* of political questions. Neal Postman argued for the importance of asking questions about how new technologies frame problems, whose problems these are and about who benefits from new technologies in the chapter on 'technology' in his *Building a Bridge to the Eighteenth Century* (Postman, 1999). George Marx (1998) provides a list of questions to ask about information technologies and the data they gather, which includes questions about the impact of such technologies on power relationships and about the symbolic meaning of adopting particular methods of information gathering. Hofmann (2005, updated in Hofmann et al. 2014)'s thoughtful list of questions to ask about health technologies is admirably aware of the symbolic dimensions of health technologies and the fact that they implicate the interests of multiple parties differently. Van Gorp (2009) includes a list of questions that, he suggests, those developing new technologies – and especially information technologies – should ask early in their research, although these questions are mostly concerned with the risks posed by the materials used in new technologies and entirely neglect the implications of technologies for the life world that are a central concern herein. Wright (2011)'s 'framework for the ethical impact assessment of information technology' includes a long and well-formulated list of questions to ask about new information technologies, which highlights (some of) the political dimensions of these technologies.³

However, as this brief survey suggests, for the most part, existing accounts are either specific to particular sorts of technologies or limited in the number of issues that they raise – or both. It is to correct for this deficiency that I have developed a new, more 'political', Socratic approach (a 'Socratic ethics interrogation tool'), which: is intended to be suitable for technologies more generally; highlights the impacts of technologies on relationships between various parties, on the distribution of power and on social understandings that shape the options available to people; and, aspires to be comprehensive with regards to the full range of ethical questions technologies might raise. The tool consists in a series of open questions, marked with bullet points, grouped under various headings. It is Socratic in that it asks that we ask questions but shares features in common with 'checklists' insofar as it lists a series of questions that need to be answered before one can be confident that one has adequately considered the ethical issues that might be raised by a particular technology. However, it is important to emphasise that it does not allow users to 'tick off' that various pre-identified ethical issues have been dealt with (Hofmann, 2005; Wright, 2011).

Each question is accompanied by a series of prompts, which usually consist of more specific questions, to help investigators answer it. The questions marked with bullet points are open to ensure that the tool is suitable for evaluating as wide a range of technologies as possible and

is capable of picking up as many ethical issues as possible. The questions are phrased as though one was thinking about a technology that was being developed or that was about to be developed but may easily be rephrased as required to consider an existing, or even a historical, technology.⁴

The first three sections, 'Affordances', 'Use and context' and 'Choice and responsibility', which are informed by science and technology studies, invite investigators to think about how the technology shapes its use, is likely to be used in practice and impacts on the moral responsibilities of the designers, and users, of the technology. 'Interests' asks about risks and benefits, which are consequentialist concerns (Pettit, 1997), although it is also concerned with their distribution and thus with questions of justice. 'Power' and 'Inclusion, exclusion, discrimination and bias' are concerned with questions of power and social justice, with the latter group of questions foregrounding the differential impacts of technologies on people of different races, genders, classes and/or sexualities that have loomed large in arguments about algorithmic justice in the last decade (Eubanks, 2018; O'Neil, 2016; West et al., 2019). The questions grouped under 'Framing, meaning, and lifeworld' address communitarian concerns about the impacts of the technology on social understandings and relations (Ihde, 1990; Verbeek, 2011), as well as concerns stemming from virtue ethics (Vallor, 2016), both of which tend to be neglected in many discussions of technology ethics. 'Misuse' encourages us to think about how a technology might be used in ways not intended by the designers and/or by malicious actors and about the responsibility of the designers for the fact of, and the consequences of, such misuse. 'The environment and non-human animals' interrogates the implications of the technology for the non-human world, while 'Future' raises questions of inter-generational justice. The prompts in the final set, 'Process, consultation, iteration', are slightly different to the others insofar as they pose choices for the designers of the technology directly and not just questions and because designers could, in most cases, choose to address any concerns that arise as a result of answers to the questions in this section without necessarily reconsidering the shape of the technology.

3 | HOW TO USE THIS TOOL

I have developed the exercise set out below in the expectation that it might serve a number of communities and purposes. As with other similar tools, it may be used as a tool for individual ethical reflection, for teaching students about the ethics of design, for honing criticisms of technologies in the service of political activism and/or identifying issues that might warrant a response by policymakers or regulators (Wright, 2011).⁵ However, its primary use scenario, as I intend it, is to inform the design of technologies.

My hope is that individuals and/or organisations that are developing new technologies will make use of this tool to improve the design of these technologies. Ideally, the exercise would be completed at least twice: once, early in the design process in order that the answers to the questions in the ethics interrogation might inform that

process; and, once late in the design process, where the shape of the technology has been mostly settled but before production begins, to 'red-flag' any remaining – or new – ethical concerns that become apparent in the light of a better understanding of the final shape of the technology.

The groups of questions under each heading are designed to foreground particular sets of ethical issues, as set out above. The headings, and their ordering, as well as the ordering of questions under each heading, are intended to facilitate structured investigation of ethical issues, in which the answers to earlier questions may be drawn on to help answer the later questions. The brief introduction to each group of questions under each heading exists to provide some context and explain the ethical issues each section is intended to foreground. Inevitably, there will be some 'bleed' between categories, but where this occurs it should be welcomed in the spirit of wanting to capture the widest range of ethical concerns: The answers to the questions can be regrouped and reorganised later in the exercise if necessary.

Some questions are more relevant for some sorts of technologies rather than others: There is no expectation that the answer to every question would reveal an ethical issue. In many cases, I hope the answers to questions will be obvious and one would expect that in most cases most answers would be unremarkable. However, answering all the questions should ensure that few, if any, ethical issues are missed.

While a sole investigator will usually be able to answer the questions in an hour or so, adding discussion amongst multiple investigators will require more time. Insofar as a key goal of the ethics interrogation is to minimise the chance that we will miss or ignore an ethical issue raised by a technology and because what we see sometimes depends on where we stand (Harding, 1991; Hartsock, 1983), the existence of different perspectives amongst those completing it will significantly enhance the value of the exercise. Thus, if possible, the exercise should be completed with a diverse community, in the sense of people with different religious and political commitments, of different races, different sexes, ages and sexual orientations, but also of relationships to the technology itself. That is, ideally, participants would include not only the designers of the technology, but also members of the community of intended users, those to whom the technology would be marketed and sold (who may be different to the users) and members of the community more generally (Palm & Hansson, 2006). Including those who might be affected by the technology offers an opportunity to garner some of the benefits of a stakeholder approach in the course of the Socratic inquiry (Hofmann et al., 2014; Van der Velden & Mörtberg, 2015). Where a group of people are involved, going through the list of questions will typically require a half-day, or even a whole day, workshop. The exercise should be introduced to the whole group and then participants divided into small groups to 'brainstorm' their answers to the questions. Depending on the context, and the time available, it may sometimes be appropriate to ask different groups to answer different subsets of the questions below. The small groups can then report back their conclusions – or these can be collated by being written on a whiteboard (or via similar means) – before

returning to larger group discussion at the end of the session. Inviting the whole group to rank the ethical issues identified from least to most significant and/or from easiest to hardest to address is one way to provide a focus for such discussion.⁶

Identifying ethical issues is a key step on the path to addressing the ethical issues that might be raised by a technology – but it is only the first step. It is also important to think about what we could do to avoid, address or resolve the issues that we identify. Particularly when the Socratic ethics interrogation tool has been used in the context of the design of a technology, those answering the questions may feel dissatisfied if the exercise is not connected to a process to address, or respond to, the findings. I have some initial suggestions as to how this task might be approached in the final section of the paper.

4 | A TECHNOLOGY ETHICS INTERROGATION

With a clear image, or account, of the technology you are evaluating in the forefront of your mind, think about, and answer, the following questions.

4.1 | Affordances

Technologies make it easier to perform particular tasks. However, some tasks may be harder to perform with a given technology, as opposed to an alternative technology, while others may be impossible to perform. Technologies also change how we perceive the world and our desires in relation to it: They foreground some problems and choices and obscure others (Winner, 1986). The ways in which a technology shapes the choices of those that use it are called its 'affordances' (Davis & Chouinard, 2016; Norman, 1988). Designers aim to shape the affordances of technologies so that they are well suited to their purposes but are not always well attuned to the ways in which technologies may make other tasks more difficult.

- What tasks would the technology make easier?

Think about the advantages of the technology relative to existing or alternative technologies.

- What tasks would the technology make harder?

What burdens would the technology place on the user? What other technologies might get replaced and disappear, and what might they do better?

- What problems or opportunities would the technology foreground?

What would it bring into focus or make it easier to pay attention to? What sorts of questions are people likely to people ask when

they become aware that the technology is available? What thoughts does it encourage?

- What problems or opportunities does the technology obscure?

What becomes harder to see or focus on when one is using the technology? What gets neglected or bumped down the list of priorities because it is not as easy to do as those tasks to which the technology is well-suited?

4.2 | Use and context

Often technologies are taken up and used in ways that those who designed them did not expect (Ihde, 2006; Robinson, 1993). The ways technologies are used are partially a product of social, historical and economic context (Kranzberg, 1986). At the same time, technologies have social and economic impacts. Technologies affect those who do not wish to use them as well as those that do (Kiran et al., 2015; Wyatt, 2003). In order to identify any ethical issues raised by technology, it is important to have a good understanding of how it is likely to function in practice over the whole lifetime of the technology and not just when it is first introduced (Edgerton, 2008; Palm & Hansson, 2006).

- Who are the 'users' of the technology?

Who would have reason to adopt it? Who benefits from it? Who has to learn new skills to use it?

- What are the advantages of this technology compared to existing or alternative technologies?

What becomes easier to do? What benefits does it generate?

- What incentives would the existence of the technology establish?

Who will have new reasons to do what?

- How might 'network effects' impact on the functionality and use of the technology?

Network effects occur when the functionality of a technology for any given user is dependent on the number of other people using the technology. How would the choices of users (or potential users) be affected by the choices of other users (or potential users)? What would the world be like if everyone adopted the technology?

- What jobs would it eliminate? Create? Affect?

How will the technology impact on employment and the labour market? Are the jobs it replaces 'dirty, dangerous, dull and

demeaning' or valued and experienced as meaningful by those who perform them?

- Where will it be made? By whom?

Where and how will the technology be produced? What would it be like to work making it?

- What institutional, social, economic or political circumstances does the technology rely on or presume?

Does the technology rely on particular technical standards? Does it presume a particular sort of intellectual property regime? Will the law need to be changed to enable or facilitate its use? Are there particular sorts of societies in which the technology would not work, for instance, because they have different property relations, or lack populations with required skillsets, or have a different technological infrastructure?

- How will the technology be distributed geographically?

Will it be in 'every home' or in specialist facilities? Will it be in rural areas or just in big cities? Will it be in poor nations or only in wealthy nations?

- What other technologies will emerge or disappear as a result of this technology?

Most technologies only work in the context of a technological infrastructure: The problems they solve arise because of other technologies and/or the technology itself requires the existence of other technologies in order to function. New technologies in turn make others redundant, have implications for the functionality of others and provide opportunities for further new technologies to emerge. How would this technology affect the surrounding technological infrastructure?

- How, if at all, might militaries make use of the technology?

Will it make conflict more likely? More destructive? Change who suffers in war? Technologies with military applications may raise a number of issues beyond those surveyed here and should be reviewed by persons with specific expertise in military ethics.

- Could it be used for sex?

Sex has played a large role in driving the development of various technologies, especially communications technologies. Could this technology be used to satisfy sexual desires? Technologies with sexual applications may raise issues around power relations between the sexes, about the representation of gender and the meaning of sex and love, as well as more familiar questions about privacy, which may require special attention.

4.3 | Choice and responsibility

The development of a new technology makes new options available to people and organisations: to use or not to use it; and, perhaps, others. Sometimes the availability of these options means that other options disappear. Sometimes the existence of these options means that people are effectively required to use the technology. Moreover, changing the options available to people may have impacts on what people can – or should be – held responsible for (Noorman, 2014). In particular, people can be held responsible for taking, or failing to take, the new choices available to them (Johnson & Powers, 2005; Jonas, 1973). The existence of new options may also change *who* is responsible for various things. Finally, the designers and manufacturers of technologies will be responsible for bringing the technology into existence and may have some responsibility for the consequences of its use (Jasanoff, 2016). The questions in this section concern the implications of the technology for choice and responsibility.

- How would the choice-situations of users (and non-users) be affected by the availability of the technology?

What options will appear? Which will disappear? If only some people have access to the technology? If it becomes widespread? Will the option of *not* using the technology remain realistically available to people?

- What new decisions might be made as a result of the existence of the technology and by whom?

Think about the decision to use – or not use – the technology. Who will make it? What other new choices might arise once the technology becomes available? For whom?

- What would *users* (and non-users) become responsible for as a result of the availability of the technology?

How might those impacted by the technology feel about the choice of users to use the technology? How might they feel if someone did not use the technology when it was available?

- What would the *designers* of the technology become responsible for?

How much are the uses of the technology shaped by choices made in the course of the design process? Does the technology involve algorithms or machine learning that are not transparent to users? What standards of safety and reliability should be met?

4.4 | Interests

The costs and benefits of new technologies are seldom distributed equally across the community (Postman, 1999, Chapter 3).

Understanding who stands to lose and benefit from a new technology is vital to understanding its social consequences. The distribution of risks and benefits will raise questions of justice.

- Who has interests in the technology?

That is, who stands to benefit from it? Who stands to make money from it? Who might be made worse off?

- What benefits would the technology produce?

Why would someone use the technology? How is it better than existing alternatives? Think about the technology in reality, in its social, organisational and economic context, and not just about the ideal use-case.

- What costs or risks would the technology involve or create?

What are the downsides of adopting the technology? Is there a risk of injury? Does it produce pollution?

- How are the risks and benefits of the technology distributed?

Who is made better off? Who is made worse off?

- Is the distribution of risks and benefits just?

Are some exposed to risks without their consent and/or in order to bring about benefits for others? Will those who labour to produce the technology be able to access it?

- What would happen if the technology was *not* developed?

Who would benefit? Who would be harmed?

4.5 | Power

The introduction of a new technology often has implications for social, economic and political relationships: between designers and users, between employers and employees, between organisations and individuals and between other groups differently situated with regards to the technology (Feenberg, 2010; Greenfield, 2017; Postman, 1992). These shifts in relationships will sometimes change the power that various parties have in relation to each other. The implications of technologies for power relationships are often highly relevant to their ethics.

- How would the existence of the technology reshape organisations?

Think about institutions that might adopt or be affected by the technology. Will they get larger or smaller? What new positions or roles might develop? What roles will disappear? Which roles will accumulate power? Will decisions be centralised or decentralised?

- Who gains power?

Who would have more freedom of action? More options? Who would be more able to shape the options available to others? Who would be more able to get their own way? What power do the designers accrue? Is this technology better for workers or for bosses? What does it imply for relationships between states and their citizens?

- Who loses power?

Who would have less freedom of action? Fewer options? Who would have to shape their plans to take into the account of the desires of others? Who would be less able to get their own way? Is this technology better for workers or for bosses? What does it imply for relationships between states and their citizens?

- Does the technology affect members of vulnerable groups?

Will research to develop the technology involve members of vulnerable groups, such as prisoners, children, people with life-threatening illnesses or adults with cognitive impairments? Will the technology affect members of these groups? How?

- What are the implications of the technology for privacy?

Who becomes capable of learning what about whom? Who gains information? Loses control of information?

4.6 | Inclusion, exclusion, discrimination and bias

Technologies work better for some sorts of people rather than others and impact on different sorts of people differently. How might race, gender, class, sexuality and other differences between people interact with and determine the consequences of the technology? Think here not about how the technology would be used in ideal circumstances, but how it is likely to be used in the real world marked by inequality (Eubanks, 2018; O'Neil, 2016).

- What sort of people are designing the technology?

Are they men or women? Straight, queer or trans? What races are they? How are they situated in relation to privilege? What disciplinary perspectives do/did they bring to the design process?

- What assumptions have been made about users?

Imagine someone using the technology: What does that person look like? Are they a man or a woman? LGBTIQ+? Are they old or young? Able-bodied or disabled? Poor or wealthy? Which, if any, of these assumptions are reflected in the design of the technology?

- What research and/or data informs the design and/or would inform the operations of the technology?

Where has this information come from? How has it been gathered? What is the difference between the information and the world? How might the data used in the design or operations be biased? Does the technology itself shape the data it collects? What feedback loops might occur in this process?

- How is the project gendered?

What sort of language are you using to describe it? Do you refer to the user as 'he' or 'she'? What would a child who encountered the technology say about whether it was for boys or girls? Would it be possible to use it while pregnant?

- What would be required to access the technology?

Does one need to be able-bodied to use the technology? Does one need to be literate? What skill set is being assumed in users? How much will it cost? Will it be available to people in rural areas? Could someone use it while caring for young children?

- Who is excluded?

In the light of your answers to the question above, who will *not* be able to access or use the technology? For whom will it work well? Whom will it serve poorly?

- How might the use, or impacts, of the technology be shaped by, or interact with, the history and present of racial injustice?

Will the technology work to the detriment of those who are already poor and/or disadvantaged? Will it interact with the criminal justice system? If users were racist, how might that affect the way the technology is used or its impacts?

- How will the availability, use and impact of the technology differ between the global South and the global North?

Will poorer nations be able to afford the technology? Do they have the technological infrastructure required for it to work? Will they have people with the skills to operate it? How well does the technology function in less-than-ideal conditions? Can it be repaired? Will the waste that the technology produces be shipped to the global South?

4.7 | Framing, meaning and lifeworld

As human products, used by human beings, technologies exist within a world of meanings and not just a world of things. Technologies 'frame' the world in different ways (Heidegger, 1977). They communicate

messages, which might impact on, or reveal something about, relationships between different social groups. They 'say' something about us: 'Virtue ethics' suggests that what they reveal may sometimes be ethically salient. They create and shape experiences and by doing so they change the 'life-world' we inhabit (Ihde, 1990): These changes may be morally significant (Carr, 2015; Vallor, 2016; Winner, 1986).

- What problem does the technology solve?

Who is it a problem for? Why? How?

- What is one accepting about the world when one frames the problem like this?

What are you *not* challenging or changing when you build this technology? What do you become complicit with?

- What kind of person would want to develop this technology?

What attitudes does the technology express? What does it communicate about how we think about the world and/or various sorts of people in it?

- What kind of person would use the technology?

What would use 'say' about someone? What attitudes would use of the technology express or demonstrate? What virtues and/or vices does the technology encourage?

- How might the technology impact on our experience?

What experiences does the technology make possible? What new words or phrases ('doomscrolling', 'Facebook friends', 'gas-lighting') might come into use with the existence of the technology? What experiences does it replace or transform? What is it like to use it or to be affected by its use?

- How might the technology impact on relationships between people?

What new relationships does it establish? Which relationships does it threaten? Replace? Transform? How would it affect the boundary between public and private?

- How might the meanings of key concepts change as a result of the technology?

Will the technology change what it means to do or be something? What sentences might people understand differently in a world in which this technology is widely used?

- Who is funding, investing in and/or promoting the development of the technology?

What might designers become associated with or complicit in? How might the funders, investors and/or promoters of the technology shape public reception of it? What reputational risks are involved in accepting such support?

4.8 | Misuse

Technologies are often taken up and used in ways other than those their designers intended (Ihde, 2006; Robinson, 1993). Some of these uses are malicious or vexatious. Thinking about the possibility of misuse of the technology may help to prevent it.

- What would count as 'misuse' of the technology?

What could someone do with the technology that would annoy, shock or upset you?

- Does the technology incentivise harmful, anti-social, unethical or criminal behaviour?

Thinking about the affordances of the technology, the incentives it creates, and its costs and benefits, might the existence of the technology encourage people to behave badly? Are there illegal activities that it might make easier? What new powers does it grant states?

- What options are available to prevent or discourage misuse?

Could a different design make misuse less likely? What safeguards could be put in place? Could regulation prevent misuse? How much responsibility would the designers or manufacturers of the technology have for misuse?

4.9 | The environment and non-human animals

Think about the technology over its lifetime from research to disposal and/or obsolescence....

- What resources will be consumed in the production and/or use of the technology?

Would it use non-renewable resources? Minerals from conflict zones or that are likely to be produced using child-labour? Is the technology designed to last for a long time or is obsolescence 'built-in'?

- What waste would the production and/or use of the technology generate?

How much of the technology or its products is biodegradable? Is it carbon neutral?

- What will happen to the technology when it breaks or is no longer wanted?

What does obsolescence look like? Will there be a market for second-hand or out-dated items? How much of the technology is likely to be recycled?

- What is likely to be replaced and thrown away as a result of this technology coming into existence?

The environmental benefits of new technologies can sometimes be jeopardised by the environmental costs of introducing the new technology.

- How will the technology impact on our relationship with the natural world?

Will it bring us closer to it? Alienate us? Will it create visual or noise pollution?

- What traces will the production or use of the technology leave behind?

Will it have long-term environmental impacts? Modify ecosystems? Change patterns of land use? Scar the landscape?

- How might the technology impact on non-human animals?

Will it need to be tested on animals? Does it involve or produce animal suffering? Will it destroy habitats? Or create them? How will it affect ecosystems?

- What sacrifice would be involved in not using the technology and/or using an alternative, less resource-demanding, technology?

In the light of its environmental impacts, is the technology 'worth it'? How will those in the future, looking back, feel about our having satisfied our preferences via this technology at the cost of its consequences?

4.10 | The future

Technologies, and choices about technologies, have implications for future generations as well as for those living today. Some of the consequences of our choices around technology can be very long-lived, especially if a technology generates pollution (plastics, heavy metals, greenhouse gases) or has large social or economic impacts. In rare cases it may be plausible to argue that a technology might involve a risk to the future of the human species (Ord, 2020). Choices around technology will often also have implications for future technologies, when they enable further technological developments or make it harder for other technologies to be developed or taken up

(Jasanoff, 2016). That is to say, technologies are 'path dependent' (David, 1985).

- Does the technology shape the desires and/or capacities of future individuals? If so, how?

Will the choices made in the design or use of the technology shape future people? Will they change what people are like or what they want? Is it plausible to think that (future) affected individuals would consent to these choices were they to have the option of expressing an opinion?

- How will the costs and benefits of the technology be distributed across generations?

What are we leaving behind for our children? How will people in the future feel about this technology and our use of it?

- How will this technology shape future choices about technologies?

What options does the technology foreclose? What does it 'lock in'?

- Does the technology pose 'existential risks'?

What right would designers have to impose such a risk?

4.11 | Process, consultation, iteration

The final set of questions concern how the technology will be brought into existence and the processes and procedures in place to address any ethical issues that arise as it starts to be adopted. In most cases, designers and manufacturers, and to a lesser extent, regulators will be able to determine the answers to these questions through the choices they make: These questions flag options that those answering them might pursue.

- Are users and/or potential users involved in the design process?

How did the designers identify the need for the technology? How did they decide what users wanted? Will the principles of co-design, participatory-design or user-centred design be followed during the design process?

- Will those who are, or will be, affected by the technology be consulted before it is developed or used?

Will the decision to pursue the technology be debated in public? Will it be democratic? Will those affected by the technology feel that their lives have been changed without anyone consulting them?⁷

- Does the technology comply with relevant law and standards in all the jurisdictions in which it is likely to be used?

Has someone checked?

- What mechanisms exist to identify and track ethical issues if/when they emerge?

How will the designers and/or regulators of the technology become aware, if they will at all, of emerging ethical issues? Who, if anyone, is tracking how the technology is used, its social and economic impacts and the ethical issues that it creates? Is there a formal review process in place?

- What, if any, challenges exist when it comes to regulating the use of the technology?

Could governments regulate the production and use of the technology effectively if they so wished? Is use of the technology routinely transnational? Can the technology be produced easily once it exists? Can use be concealed? Would it be possible to restrict particular uses short of banning the whole technology? What opportunities do relevant standards and/or the social and legal contexts necessary for the technology to function offer to shape the way it is used?

- Will it be possible to change the design of the technology in the light of any problems that emerge once it starts being used?

How much control will the designer of the technology be able to exercise over future iterations of it? Is it feasible to make the technology so that it can be used for some purposes but not others?

5 | CONCLUSION

Answering the questions above will not necessarily tell one whether a technology is 'ethical' or 'unethical': It is too much to ask of any mechanical process that it should do this.⁸ However, what the exercise offers organisations, managers, policy makers, academics and ordinary citizens is a concrete means to generate a reasonably comprehensive account of the ethical issues that a technology does, will, or might, raise. Nor have I tried here to set out a list of ethical principles according to which technologies should be evaluated or the ethical issues they raise resolved. Such lists may be found elsewhere (Hagendorff, 2020; Jobin et al., 2019; Van den Hoven et al., 2015, pp. 301–567). My focus here has been on helping identify those issues that will need to be resolved by means of one's preferred framework. That, as I intimated above, the use of lists of ethical principles to address ethical issues often neglects or obscures the political aspects of technologies that the current list of questions is intended to highlight suggests that care will need to be taken to guard against this possibility in turning to such tools. Finally, asking and answering questions will not suffice to ensure that anyone will act on the answers in order to make a technology more ethical (Hagendorff, 2020).

There are, however, steps that organisations – and even individuals – can take to increase the chance that ethical issues will be addressed effectively.

An important first step is to abjure technological determinism – to acknowledge that societies can and do exercise agency when it comes to whether or not particular technologies are developed and also the form of those technologies that are developed, as well as the uses to which they are put. Similarly, recognising that technologies have affordances offers opportunities, at the same time as it highlights challenges, for shaping the uses to which they are put: Designers have (some) power here.

Second, organisations may provide institutional scaffolding to connect the process of Socratic enquiry to mechanisms to operationalise its results. For instance, particular people may be assigned carriage of particular issues identified in the course of discussions and be invited to report back, at some predetermined time, on what action they have taken to ensure that they are addressed. Relatedly, it will often prove productive to identify third parties who are best placed to evaluate whether efforts to address particular ethical issues have been, or are likely to be, successful and to offer them an opportunity to provide input on this as the technology is introduced. That is, this is another point where stakeholder engagement may usefully be combined with the Socratic approach.

Third, as the remarks about technological determinism and affordances above intimate, we are more likely to be successful in – and satisfied with the results of our – attempts to design ethical technologies or to ensure that new or existing technologies are employed ethically, if we have a realistic sense of what it is possible for individual actors, be they people, corporations, or governments, to achieve. In many cases, citizens will have limited input into the design of technologies. In some cases, effective regulation of technologies will require coordinated action at a global level. The opportunities and resources available to reshape or regulate new (or existing) technologies also vary according to the nature of – and the balance of political forces in – the society in which the task is being attempted. In capitalist societies, for instance, there will be strong incentives for businesses to use new technologies in whichever ways will maximise profits and few political mechanisms to facilitate direct regulation of the use of technologies. In such circumstances, the best ways to influence the development of technologies may be via activism around the detail of the technical standards that shape technologies and/or engaging with the background structure of law – especially property law and contract – on which markets, and technologies, rely. Insofar as successful products are also dependent on consumer demand for them, cultural interventions of the sort pioneered by social movements over the last several decades may also be effective in shaping technological trajectories.⁹ In societies in which the state is more amenable to playing a direct role in regulating the uses of technologies, those concerned with the ethics of technology may have more, and more effective, means of leverage but will need to be vigilant to ensure that entrenched political and/or institutional interests do not hijack attempts to

facilitate the design and use of ethical technologies and that regulations do not stifle applications of technologies that may be important to the technologies reaching their ethical potential. The politics of technology cannot be isolated from politics more generally: One important lesson that may be learned from considering the politics of technology is that there is a strong case for empowering citizens more generally in order that they may have more say in the circumstances of their daily lives.

Better – more ethical – technologies will not suffice to make a better world. However, bad technologies and bad ethics will make a worse one. Association with bad technologies may generate significant reputational and commercial risks for businesses. Moreover, better technologies, as well as the struggle to bring them into existence, can help build a better, more just, more equitable and more hospitable world. Asking the right questions about technologies and, in particular, about their implications for power and for social justice is an essential first step in this larger project.

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DATA AVAILABILITY STATEMENT

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ETHICS STATEMENT

The research did not involve human participants and/or animals. The research did not require informed consent.

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ENDNOTES

- ¹ For volumes that make valiant attempt to do so, see Van den Hoven et al. (2015), and Yaghmaei and van de Poel (2021).
- ² An observation that was also made some decades ago by Winner (1986, 158–163).
- ³ Kuzma et al. (2008) includes an extensive list of questions to ask about mechanisms for oversight of science and technology themselves.
- ⁴ Reijers et al. (2018) describe the former approach as “*ex ante*” and the later as “*ex poste*”.
- ⁵ For teaching purposes, it may often prove useful to ask students to address some subset of the questions below rather than the full list of questions.
- ⁶ I have trialled various versions of this tool in graduate teaching for the last several years: The suggestions – and estimates of the time required – here are informed by that experience.
- ⁷ Wright (2011) offers an excellent discussion of different tools that might be used to engage stakeholders in discussions of the ethics of new technologies.
- ⁸ For an attempt at an assessment of the utility of ethics assessments more generally and of the impact of the responsible innovation literature as a whole, see Yaghmaei and van de Poel (2021)
- ⁹ For instance, technologies that are obviously sexist and/or racist are increasingly hard to market in many societies because of the attention that has been drawn to these issues by feminists and racial justice activists. The success of environmental campaigns against GMO’s in Europe is another example.

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