

## 16D PHILOSOPHY AND ETHICS OF TECHNOLOGY

### Philosophy of Technology

Over the past forty years the field of “Philosophy of Technology” has been developed, with major contributions by Frederick Ferre, Don Ihde, Marc DeVries, Ibo Van der Poel, Herbert Dreyfus, Andrew Feenberg, and William Vanderberg. Topics considered include

- What is Technology?
- Technological objects in context
- Is technology neutral?
- Ethics of technology.....

A closely related field is the study of (Science,) Technology and Society, which explores the social-cultural impacts of technology, an important consideration for engineers. For many years the IEEE published a magazine on “Technology and Society,” with articles by engineers, philosophers, and social scientists. Primary contributors included Stephen Unger, Norman Balabanian, Joseph Herkert, Karl Stephan, and Robert Whelchel. Here the topics included

- Impacts of the Internet
- Amish technology
- Rural electrification
- Privacy
- Cybersecurity
- Nuclear arms and warfare
- Technology transfer
- Controlling technology
- Robotics, automation, and job losses
- Trade competition
- Environment

### Dimensions of Technology

As writers pursue the “philosophy of technology” they often describe a technical object as having multiple dimensions for study or dimensions of meaning, including these:

- The object or system (artifact) itself
- The physical and material properties of the object
- The processes used to produce the object
- The maker/designer of the object
- The intended use(s)
- The intended user(s)
- The actual use of the object
- The social-cultural background of the object

Vermaas [1] proposes that all technical artifacts are associated with three notions:

1. The physical object itself
2. Its function
3. A “use plan”- from social tradition or from engineering designers

Values that are transmitted by designs-

- Safety
- Freedom
- Economic benefit
- Sustainability

Daniel Bell specifies five dimensions that highlight how technology transforms culture and social structure: [2]

1. Function-intended use (without regard for the past)
2. Energy –how it shapes design and use
3. Fabrication –machines replacing humans and allowing for mass production
4. Communication and control –automation, digital control -part of all modern machinery
5. Algorithms –decision rules replacing human judgment

Balabanian suggests that technology has five meanings or dimensions: [3]

1. The object itself (hardware/structures/materials)
2. Knowledge (the processes and techniques)
3. Humans -Personnel involved
4. Organizations and systems
5. Economic and political power resulting from technology

## Promises of Technology

Mander notes the near-utopian promises associated with technology in the past century: [4]

*Ads promoted throwaway living, disposable items to cut down household chores, and scientific food production, including feeding antibiotics to livestock and using pesticides on crops. DuPont was promising, “Better things for better living through chemistry.” Westinghouse was saying, “There is a lift to living electronically.”*

*These were the decades in which the American Dream was being created. Technology was going to make anything and everything possible. With the war over, not even the sky was the limit. Negative thinking was eschewed.*

## Technological Pessimism

The other side of the coin is technological pessimism or technophobia (fear of technology). With its god-like structure, suggest these writers, technology becomes the criterion of good and evil in our society.

*These... are the main themes that run through the works of the antitechnologists:*

- (1) Technology is a “thing” or a force that has escaped from human control and is spoiling out lives*
- (2) Technology forces man to do work that is tedious and degrading.*
- (3) Technology forces man to consume things that he does not really desire.*
- (4) Technology creates an elite class of technocrats, and so disenfranchises the masses. [5]*

*The problem with some earlier writings on technological effects on identity is that they tend to propagate the assumptions of the mechanical-industrial viewpoint. Thus, when writers like Ellul or Mumford or Heidegger wrote about the Machine Age, and the loss of individuality, identity, autonomy, or freedom in the face of industrial society, they were assuming that this was the only possible vector for technology -- that it could only lead to depersonalization and the destruction of humanism. They assumed industrial development and modernization were on an irreversible course. [6]*

## Philosophers of Technology

One of the earliest proponents of technology was Francis Bacon.

*Francis Bacon (1561-1626) was the chief publicist for practical science in the 16<sup>th</sup> century. He proposed a program in which “science and technology ordered and encouraged by the state, the monarchy and parliament, was to serve as the chief means of advancing the social order.” Human betterment for all classes, he believed, would arise not from a science based on Platonism and Aristotelianism but from “the empirical method and the practical arts.” [7]*

Modern technology has been analyzed by the following writers:

### 1. Heidegger

Martin Heidegger (1889-1976), an existentialist philosopher, presented his view of technology in *The Question of Technology* (1954), which is not an easy read. [8]

- Technology is a human activity, a means to an end, a way to get things done.
- Technology is a driving force in culture and may threaten to slip from human control.
- Technology leads to a faulty view of the world.

The essence of Heidegger’s essay “On the Question of Technology” was this:

Traditional technology was seen as a means to an end, responsible for the harnessing of nature, used to meet our needs. Modern technology uses not only nature “but humanity itself.” “We are forced to treat human beings as mere resources,” which means that “technology is a danger.” [9]

“Heidegger’s Hammer”: When we see a hammer, whether a claw hammer, sledge hammer, or ball peen hammer, we recognize it immediately for its use. We don’t primarily focus on its material or its color. Tools have an intended use.

(Certainly technology can’t have a mind of its own or a goal of any kind. However, when sinful humans apply technology towards a given end it can appear to be moving society in a given direction.) [10]

## 2. Ellul

Jacques Ellul (1912-1994), French law professor and philosopher (who also wrote on Christian topics), was the author of *The Technological Society* [11] Ellul emphasized what he called “technique,”---

- As technique expands, the world becomes a process,
- Human actions are evaluated primarily in terms of their efficiency.

Jacques Ellul felt that technology was dehumanizing us.

*In his work **The Technological Society** Ellul gives a phenomenology of technology and its role in society, shifting from one aspect to the all- encompassing paradigm. He argues that the modern mindset after the industrial, political, scientific, technological revolutions of the 15th- 19th centuries shifted from one in which technical knowledge was one among many types of knowledge and technology was descriptive of tools or machines, to the contemporary notion that every aspect of life is technical, can be measured, made more efficient, commodified and in extension to his work marketed. For Ellul, the machine has us, because we have become the machine. [12]*

*The first enduring aspect of Ellul’s critique of technology concerns its status and function as a (if not the) sacred centre of our existence and culture. Technology (he liked a capital “T” to make this point) refers not simply to isolated, individual machines or methods but to the totality, the ensemble of “means”*

*(tools and methods) characterized by rationality, artificiality, and the quest for efficiency.*

*“Technology” in this broad sense includes computers, cars, and the like, but also human technologies like psychotherapy, public relations, and industrial management. Ellul actually didn’t like the word “technology” (he preferred la Technique) because it often had a restricted connotation of engineering and machines, and its historical etymology implied “the study of technique.” [13]*

*To throw this wager or secular faith into the boldest possible relief, Ellul places it in dialectical contrast with biblical faith... Whereas technology is the attempt of human beings to create their*

*home in this world, the Bible denies that they are ever truly at home here (see Matt. 8:20 and Luke 9:58). In his richly detailed biblical studies Ellul is able to propose a more explicit alternative to the technology of the technician than does either Ortega or Heidegger. Like Mumford, he invests considerable imagination in the alternative to the technological way of being in the world. But unlike Mumford, this alternative is not just an alternative technology, the aesthetically pleasing urban landscape. The biblical view of the city is quite different from technical and aesthetic ones. [14]*

“Technique elicits and conditions social, political, and economic change. It is the prime mover of all the rest...” [15]

The difficulties with Ellul’s approach, says Pitt, are that he makes claims for the autonomy of technology, “attributing causal powers to it” and “removing the responsibility from human shoulders.” (Pitt 87) The fact that the original inventor cannot control future development or foresee all possible consequences does not make the technology autonomous. [16]

CS Lewis picked up on some of Ellul’s ideas-

“There is something which unites magic and applied science (technology) while separating them from the "wisdom" of earlier ages. For the wise men of old, the cardinal problem of human life was how to conform the soul to objective reality, and the solution was wisdom, self-discipline, and virtue. For the modern, the cardinal problem is how to conform reality to the wishes of man, and the solution is a technique.” [17]

### 3. Mumford

Lewis Mumford (1895-1990), literary critic and historian, looked at technology through the concept of the “megamachine,” where technology uses human workers to produce its results:

“The megamachine is an invisible structure composed of living, but rigid, human parts, each assigned to his special office, role and task, to make possible the immense work output and grand designs of this collective organization.” [18]

*Lewis Mumford, cultural critic and historian, presented the thesis (primarily in *The Myth of the Machine* -1966) that through the ages two opposite kinds of technology have continually been present and in a struggle: (1) “democratic technics,” which focused on individuals, small-scale production, craftsmen and toolmakers, and artistic culture, and (2) “authoritarian technics,” which focused on the leaders and the elite using common workers for the construction of huge projects, particularly the Egyptian pyramids, but also armies and sweatshops. [19]*

### 4. Marcuse

Philosopher Herbert Marcuse (1898-1979), strongly influenced by Karl Marx and considered one of the founding lights of the New Left, tapped in to the feeling of alienation in the rising generation. In a series of essays and the book *One-Dimensional Man* [20] he argued that instead

of freeing workers technology instead “entrenches their enslavement” in the industrial system. The need for efficiency and productivity become the “ordering mechanism” of the labor force. The need for human freedom, he argued, had to overcome the dehumanizing effects of mechanization.

## 5. Winner

Langdon Winner (b. 1944) is the author of *The Whale and the Reactor* [21] and *Autonomous Technology* [22]. His ideas include:

- Technological determinism exists
- Technology has been used for political purposes
- Technologies have ways of ordering our lives (by steel, concrete, wires, and circuitry)
- Technology easily gets out of control
- Innovation is not always positive

*Building on the work of Ellul, Winner further elaborated the idea of technological determinism, in particular that of autonomous technology. According to Winner, the following two hypotheses might be said to characterize technological determinism: '(1) that the technical base of a society is the fundamental condition affecting all patterns of social existence, and (2) that changes in technology are the single most important source of change in society.' As far as the second hypothesis is concerned, the implementing of new technologies is something that often has unintended and unpredictable social consequences. Because of these uncertain and unintended effects, Winner refers to something known as 'technological drift': we start to drift more and more 'in a sea of unintended consequences' as the speed and large-scale nature of technological development increases. [23]*

Ellul and Winner have suggested that technology expands with time (and acts in an autonomous way), but is this actually possible? Technology has no independent will, and nothing is outside the control of God. What does make sense is a positive feedback loop involving both humans and the technology, in which humans develop an area of technology, put it into use, and then receive positive feedback (we like the power or the sensation involved), driving them to develop it still further and to expand its use.

## 6. Feenberg

Andrew Feenberg (b. 1943), in *Transforming Technology* [24], suggests that technology has no essence of its own apart from the social-political sphere. He discusses the “democratic transformation of technology” and insists that technology should be accessible and inclusive.

“What human beings are and will become is decided by the shape of our tools no less than in the actions of statesmen and political movements.” [25]

## 7. Jonas

Hans Jonas (1903-1993) notes that while technology previously was simply practiced, it has now become the measure of progress. With modern technology we always expect something “newer” and “better.” Our use of technology must include responsibility for results. [26]

## 8. Vandenburg

Willem Vandenburg (b. 1944) was schooled a civil engineer and became a scholar of Jacques Ellul’s works. In *Living in the Labyrinth of Technology* [27] Vandenburg notes how technology changes people.

- Technology influences human life, society, and the environment.
- We have a growing reliance on images rather than words.
- We are losing in-depth and interdisciplinary knowledge of things.
- Specialists arise in every area and don’t cross boundaries.

## 9. Postman

Neil Postman (1931-2003) issued numerous warnings about popular technology which are even more relevant today. In *Technopoly* [28] he argued that

- Society no longer used technology for support but was actually shaped by it.
- Tools became the driver of culture and change.
- The goal of all human activity became efficiency.
- The end result was the loss of moral foundations.

## Ethics of Technology

New technologies give rise to new issues and choices that didn’t previously exist. A number of unique issues arise when we consider ethical considerations involved with technology use:

- Technological danger
- Technological risk
- “Digital divide”
- Unforeseen consequences
- Security
- Surveillance/privacy
- Loss of personhood

Here our starting point might be the Engineering Code of Ethics, which begins its list of principles with the statement that "Engineers (developers of technology) shall hold paramount the health, safety, and welfare of the public..."

Miller [29] considers the following ethical dimensions of technology:

- Product safety and quality.
- Impact of technology on societal values. What do we value, and what goals do we pursue?
- Impact of technology on economic and political systems.
- Control over technology (including development, manufacture, distribution, and application) and control over information determines centers of power.
- Rationing of limited resources. Who gets access to resources and who, or what decides?
- Conflict between the potential good of different parties, or the balancing of potential for good and evil. The answers to most ethical dilemmas are not black and white.
- Technology involves a multitude of levels and components. There is usually no clear responsibility for ultimate outcomes.

Three approaches are possible when values come into conflict :

- Cost-benefit analysis /Utilitarianism
- Moral reasoning and human “good-will” /(Kantian ethics)
- Establish highest values at the start of the design/(virtue ethics)

Frederick Ferre wrote one of the first books on the philosophy of technology. [30] In it he laid out these points:

*Technology is implemented, not 'empty-handed': “[I]t would be wise to resist a definition of technology that includes empty hands as technological implements. The totally naked human body, interacting face-to-face with the environment, unmediated by any artifact, contrivance, invention, or tool, would seem to stand as a paradigm case of the non-technological.”*

*Technology is practical, not 'for its own sake': Where “the notion of the 'practical'. . . [means] supporting such ends as survival, health, comfort, and material well-being.”*

*Technology is embodied, not 'in the head' alone: “[I]t would be wise to guard against the absorption of all methods and techniques, including wholly mental ones, into the concept of technology.” He uses the examples of natural language and mathematics.*

*Technology is intelligent, not 'blind': “[T]he concept of technology will not usefully be extended to behavior that, among humans, is merely accidental or, among other species, is entirely instinctive. [31]*

Mitcham and Briggles noted the ability of modern machinery to reorder matter and energy for new ends understood in terms of human autonomy:

*Technological science thus became the basis for a progressive technological activity that produced artifacts more systematically and in greater abundance than ever before. With only minor stretching, ethics may be conceived as a technology-like science. Ethics is technical insofar as it involves specialized terminology and includes techniques for the making of human action; it is scientific in the sense of involving systematic reflection and critical analysis.*

*Technical skill was valorized when pursued within such limits and toward worthy goals such as the preservation of life and community. However, the limits were all important, because technical activity can quickly be overextended and create wealth that undermines virtue, change that weakens social stability, and a will to power at odds with natural piety or human flourishing. [32]*

The authors describe three 20<sup>th</sup> century schools of ethical reflection on technology: [33]

1. Socio-critical –technology with potential for human liberation (Marx, pragmatism)
2. Historico-cultural –technology and human personhood, threats to authenticity (existentialism)
3. Analytic – technologies as problems or solutions (utilitarianism)

Basden writes-

*That humanity was given the role of shepherding creation towards its destiny in Christ implies joyful responsibility in all areas – others ignore ethics or reduce it to power. That the Mosaic law and prophets were concerned with structural good and evil implies that we should be too – many focus only on individual ethics. That evil arises because we turn away from God and that Christ came to save implies we should not look to (technology) to solve our problems, but should focus on changing the human heart. That we live in God's world implies that ideas emerging from supposedly godless minds might include some genuine insight – I am therefore challenged to sift and discern. [34]*

John Haas concludes:

*The moral dilemmas arising from the mind-boggling advances in medicine and technology do not admit of easy, simplistic solutions. But they are not insoluble. We as a people have the cultural and moral resources to address these questions in a humane and reasonable manner because we draw on a tradition, a tradition of natural law...because it respects humanity as a divine creation...In our own founding documents we acknowledge “the laws of nature and nature’s God” and hold that...”all men have been endowed by their Creator with certain inalienable rights”... [35]*

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