Ethics and Technology

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Natural and Artificial Sciences

Natural Sciences

Ruled by DISCOVERY and TAXONOMY

Artificial Sciences *(Herbert Simon)*

Ruled by DESIGN of new artefacts

The role of technology

DESIGN as a creative activity

But...

A lot of people consider technology to be just "applied science"

Natural and Artificial Sciences

Century of Progress Exposition

Chicago - 1933

The official slogan (the assembly-line view):

Science Finds

Industry Applies

Man Conforms

Is it true?

Science and Technology: Technoscience

The egg and the hen: Who precedes who?

Technology has been more than "applied science"

YESTERDAY: **The wheel and friction theory**

RECENTLY: **Steam engine and thermodynamics**

TODAY we have:

Science based on technology

Studying how and why artefacts work

Technology that applies science

TECHNOSCIENCE (Gilbert Hottois)

Science and Technology: Technoscience

History of Science

From Mesopotamia and Egypt

XVII century - modern science revolution

History of technique (or technology)

***ALWAYS**: from the Neolithic: tools and artefacts*

We are "Homo Sapiens Sapiens" but, more than that,
HOMO FABER

XVIII century - industrial revolution

*1820 - James Bigelow coins the word **technology***

On Technoscience

TEKNÉ (Greece) - classical

Instrumental part of a science or art (CRAFTSMEN)

Trial and error method opposite to theory and speculation

SCIENCE

The speculative part (THEORIES)

TECHNOLOGY - modern

Industrial productive methods based on scientific knowledge

From Stradivarius technique to modern technology

CTS
On Science & Technology

SCIENCE

*Changes the way we **SEE** the world*

TECHNOLOGY

*Changes the way we **LIVE IN** the world*

SOCIAL IMPACT OF SCIENCE & TECHNOLOGY

The fundamental role of technology

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The growing speed of change

The growing speed of change

Modern Science revolution *(from XVII century)*

Industrial revolution *(from XVIII century)*

The Big Technological Revolutions

Agricultural -

Neolithic	- sedentarism	(cities)

Industrial -

XVIII century	- Steam engine	(train)
XIX century	- Electricity	(high voltage lines)
XX century	- Infotechnology	(Internet)

The growing speed of change
Future Shock

Future Shock (1970) - Alvin Toffler

We will not die in the same world we were born!

An old "oriental" curse:

I wish you will live interesting times!

Technoscience:

The main engine and accelerator of change

A false controversy:

Technoscience versus humanism

USING TECHNOLOGY IS NATURAL TO THE HUMAN BEING

Social and technological determinism

Is it possible to design the future?

Do we have the technology we desire, or we just use the technology that is offered to us?

Who makes the crucial decisions on technology?

A REALITY

human individuals have very few control on the technologies that affect their lives

Two approaches: social & technological determinism

Technological determinism

There is a techno-scientifical primacy

technology acts as an independent and autonomous force

Technological development is a process:

autonomous, necessary & unstoppable

That determines completely social and cultural development

Example: Chicago Exposition Slogan

Science Finds - Industry Applies - Man Conforms

Social determinism

There is a cultural and social primacy

Technological development is decided according the interest of social communities (groups with ideological, economic, politic and/or religious power)

The development of society is determined by the values and the "cosmovision"

Example: Max Weber

The Protestant Ethic and the Spirit of Capitalism

What technology do we have?
Planned obsolescence

THE WASTE MAKERS - Vance Packard (1960)

A classical example: new models of car in order to promote change and stimulate consumers

A sales system that mimes a technological change

A new example: COMPUTERS

The planned obsolescence with, perhaps, technological reason.

Future Shock
The Sorcerer's Apprentices

Is it possible to design the future?

Who really knows the consequences of actual decisions?

An example: the car industry development

PROSPECTIVE: The science of prediction

Is it possible? - Laplace's ingenuity

The reality of chaos and complexity...

A REALITY:

We do not know what is going to happen...

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The idea of progress

Progress as a objective

ENCICLOPEDISM (Diderot & D'Alembert)

*Reason is the tool: **science and technique***

Condorcet (1743-1794) identifies PROGRESS with **SCIENTIFIC AND TECHNICAL PROGRESS**

To know more of the universe

To have more artefacts to help living

A new faith in the material progress associated to well-being, welfare and comfort

The idea of progress
Crisis of the idea of progress

The REAL origins of a new pessimism

First World War: mustard gas

Second World War: atomic bomb

And after: environmental pollution, ecological problems, biodiversity, etc:

DDT, acid rain, hole in the ozone layer, greenhouse effect and global warming (CO_2), etc.

New criticism on the traditional idea of progress

From philosophy*: humanism opposed to technology*

From economy*: resources and residues (Waste)*

The idea of progress
New problem: Sustainability

A precedent in the sixties: Kenneth BOULDING

The **EarthShip** *metaphor*

Opposed to "frontier economy" (waste)

THE LIMITS TO GROWTH

Meadows REPORT - Roma Club - ***1972***

SUSTAINABLE DEVELOPMENT

*Brundland REPORT - Our Common Future (**1987**)*

development which meets the needs of the present without compromising our ability to meet those of the future

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Technology assessment
A must

Is imperative to assess, a priori, the possible future effects of technology

An old example: CAR industry

Today technologies with potential problems:

biotechnologies

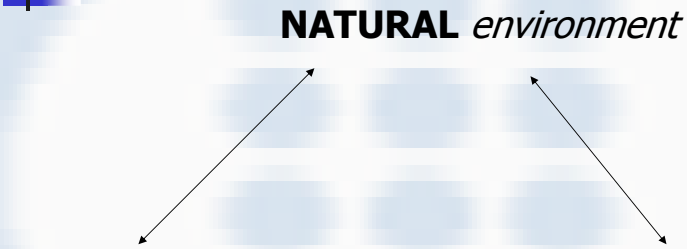
infotechnologies

An unavoidable and indispensable answer:

Technology Assessment

Recent idea: the seventies (senator Proxmire - USA)

Technology assessment
The environment triangle



An example: **Easter Island**... *(Clive Ponting)*

Technology assessment
EPISTLE

To study the impact of a technology

EPISTLE

E - environmental effects
P - psychological effects
I - institutional (political) effects
S - social effects
T - technological effects
L - legal effects
E - economical effects

Technology assessment
Responsibility & ethics

Who could do this assessment?

A first option:

*A "scientifist" approach: the **experts***

The responsibility of experts:

PROFFESIONAL ETHICS in technoscience

A second view:

A political decision that affects everybody

A multi-disciplinary study

Expert's collaboration with politicians and people

Technology assessment
Control of technoscience

The new responsibility of experts

We need ethics for technoscience

Ethical codes for engineers and scientists

Bioethics

The main approach: "Whistle-Blowing"

The social role and the responsibility of scientists and engineers to inform about problems and dangers

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Ethics in Technology
Whistle Blowing (1)

There is a conflict between obligations due to:

The employers

The customers

The public

The Whistle-Blowing is a must, when:

The obligations to the public could override the obligations to the employers and/or clients

The real problem:

HOW TO MAKE SUCH A DECISION?

Ethics in Technology
Whistle Blowing (2-a)

Martin-Schinzinger: ETHICS IN ENGINEERING

Main characteristics of Whistle-blowing:

1-Information is conveyed outside approved organizational channels or in situations where the person conveying it is usually under pressure from supervisors or others not to do so.

2-The information being revealed is NEW or NOT FULLY KNOWN to the group or person it is being sent to.

Ethics in Technology
Whistle Blowing (2-b)

3-The information concerns what the whistle-blower believes a significant moral problem concerning the organization: criminal behaviour, unethical policies, injustices to workers within the organization, and THREATS TO PUBLIC SAFETY.

4-The information is conveyed intentionally with the aim of drawing attention to the problem

There could be:

External whistle-blowing

Internal whistle-blowing

Ethics in Technology
Whistle Blowing (3-a)

When the external whistle-blowing is morally PERMITTED?

1- If the harm that will be done by the product to the public is serious and considerable

2- If they make their concerns known to theirs superiors, and

3- If getting no satisfaction from their immediate superiors, they exhaust the channels available within the corporation, including going to the board of directors

Ethics in Technology
Whistle Blowing (3-b)

When the external whistle-blowing is morally OBLIGATED?

4- He [or she] must have documented evidence that would convince a reasonable, impartial observer that his [or her] view of the situation is correct and the company policy wrong

5- There must be strong evidence that making information public will in fact prevent the threatened serious harm

Richard T. De George: **BUSINESS ETHICS**

The problem with WHISTLE-BLOWING

The difficulty of Whistle-Blowing

- A sacrifice?: personal consequences of WB
- We are taught not to whistle-blow
  - *What about that thing that we learned at primary school: not to be an "informer"…*
  - *What about group solidarity*

The main problem of Whistle-Blowing is a subjective approach: **when to make such a decision?**

Ethics in Technology

Is it possible to be ethical in our society?

John Kenneth Galbraith:

*"corruption is inherent to the capitalist system because **people confuse market ethics with ethics themselves.**"*

Richard T. De George:

***The Myth of Amoral Business**:*

"Business is concerned primarily with profit. […] business are not explicitly concerned with ethics. They are not unethical or immoral*, rather they are* amoral *insofar as they feel that ethical considerations are inappropriate in business."*

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Ethics and Technology
Summary (1)

Science and technology (technoscience) have been developing, in the recent centuries, a great impact on society.

Technology is the most effective item in the pair.

The changing society, under a "Future Shock", is subordinate to a social or a technological determinism

Planned obsolescence as the most usual way of developing technology in capitalism

Ethics and Technology
Summary (2)

The idea of progress as the scientific and technological progress is recent in the history of humanity (Condorcet - 1794)

The XX Century introduces crisis in this view

The growing role of technology in society introduces the need for a real technology assessment (an idea from the seventies)

EPISTLE as an acrostic that remembers all dimensions of complete Technology Assessment

Ethics and Technology
Summary (3)

Whistle-Blowing is the main approach to social and ethical responsibility of engineers

But we have been taught at the primary school not to be "informers"…

The main question remains:

is it possible to be ethical in our society?

It could be hard, but must be possible…

Ethics and Technology

A play:

Friedrich Dürrenmatt

Die Physiker (1962, revised 1980)

The Physicists

Johann Wilhelm MÖBIUS:

"What once has been tought, cannot be revoked"

Or, in another way to phrase it:

We know how to invent, but we do not know how to undo it…

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