Vulnerability in Technological Cultures
opportunities and challenges for democracy and for teaching

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"Radiation, Health and Population"

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What's the problem?

Excellent scientific and medical skills

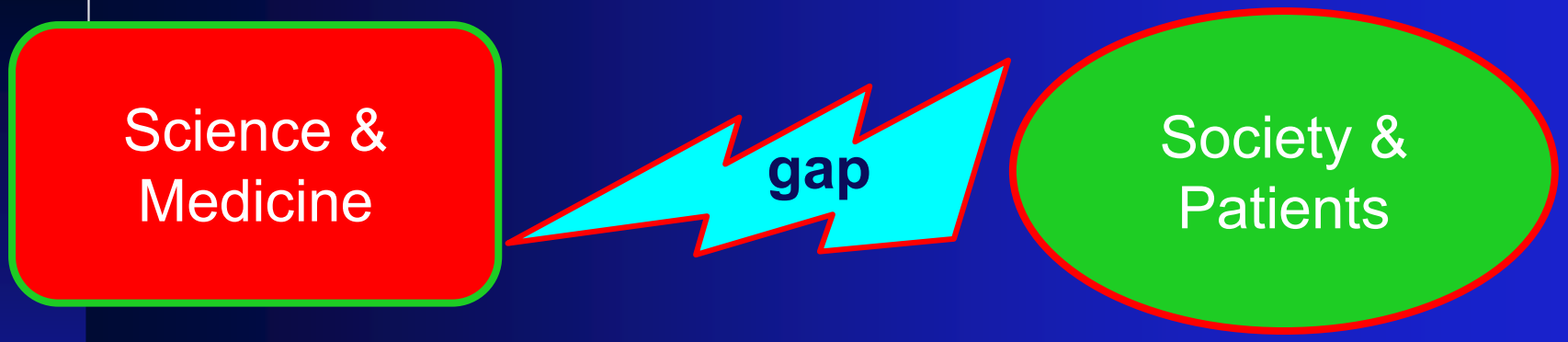
Good medical care in hospitals and radiation medicine

Poor communication between experts and public

Nuclear fear and social unrest in society

Reframing the problem

from



to

Integrating our understanding
of
science, medicine and society

Steps in my argument:

1. Reframing the issues and introduction of STS
2. Risk and vulnerability
3. Nanotechnologies
4. Experiments with democracy
5. Recommendations for medical curriculum

Standard image of science

- Scientific facts are *dis-covered* in Nature
- There is one and only one Truth, and it is universal
- Clear difference between scientific experts — lay persons
- Facts and values are completely distinct

Current views of S-T-S

- Scientific knowledge is socially constructed
- Knowledge ranges over a continuum:
  - Local — Universal
- Expertise ranges over a continuum:
  - Lay — Scientific
- All scientific knowledge is value-laden

Science, Technology and Society studies (STS)

How is scientific knowledge made?

•e.g. anthropology of laboratories and clinics

What role does science play in society?

•e.g. governing of emerging science & technology

Sociology of science, technology & medicine
Philosophy of science, technology & medicine
History of science, technology & medicine
Anthropology of science, technology & medicine

Core messages of STS

The constructivist view of science, technology and society:

1.Things could have been otherwise

A multi- and interdisciplinary approach to science, technology and society:

2.We live in a technological culture

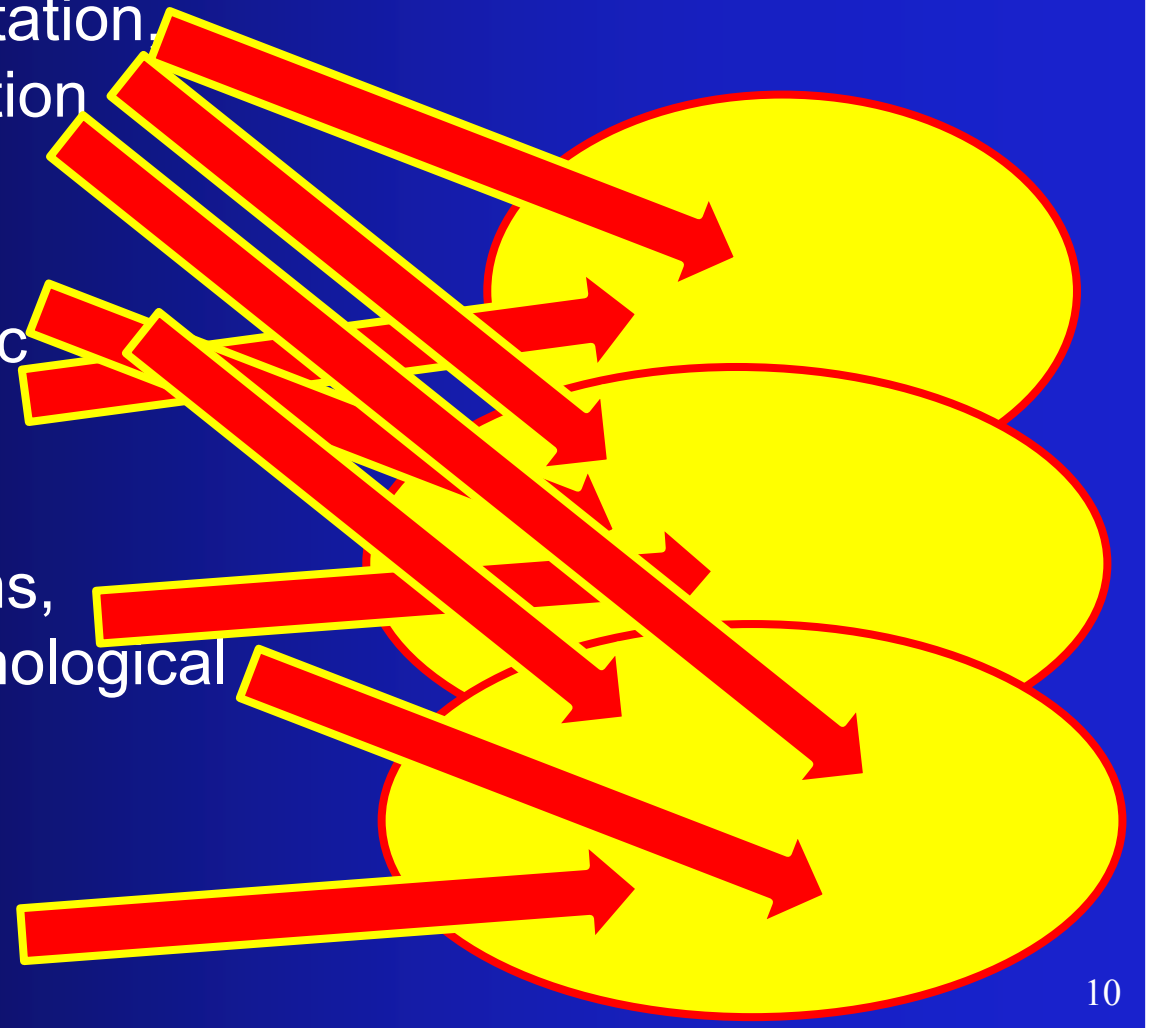
"We live in a Technological Culture"

One cannot hope to apply science and to design working technologies without understanding their role in society

One cannot hope to understand society without understanding the role of science and technology

So, what are the issues?

- Material devastation, including radiation pollution
- Socio-economic situation
- Health problems, including psychological
- Lack of trust in authorities



So, what are the issues?

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Medical doctors need to know about the relations between:

Radiation, Food, Housing, Community, Livelihoods, Social cohesion, Health, Social psychiatry, Media, Political culture

Three examples:

- **Risk & Vulnerability:**
  a new perspective
- **Nanotechnology:**
  dilemma's of science and technology
- **Experiment with democracy:**
  possibilities to interact with citizens, patients, consumers, stakeholders

Risk & Vulnerability:
a new perspective

Vulnerability: not just negative

- Vulnerability of nuclear reactors / dikes / buildings

  ↘ Only negative

- Vulnerability that comes with any sociotechnology

  ↘ Inevitable

- Vulnerability that creates flexibility, opportunities for learning, innovation, development, …

  ↘ Even positive

Vulnerability: a conceptual analysis

Negative **connotation**	***Positive*** **connotation**
Opposite to secure	Opposite to stagnated
Related to death, destruction, poverty	Related to flexibility, learning, innovation
Related to embeddedness of socio-technical systems → ***Narratives about technological cultures*** → ***Styles of risk management & precaution***	

Two vocabularies

Risk	*Vulnerability*
Society	Culture
Institution	Community
Security	Solidarity
Closure	Dissent
Uncertainty	Unpredictability
Legality	Justice
Procedure	Prudence
Prevention	Precaution
Sophistication	Humility

Student projects on Fukushima*

- **Local people's vulnerabilities:** uncertainty, anxiety, isolation, discrimination
- **Democratizing food radiation standards**: if no scientific consensus, then involve citizens, consumers, stakeholders
- **Crisis & Risk communication:** preparation, language, consistency, right medium; new technologies
- **Role of institutional trust:** trust-enhancing measures necessary for Fukushima post-disaster recovery (better communication, inclusion local communities)
- **Perception nuclear power in Japan:** **continuities** and changes in Japanese attitude towards nuclear energy

* Project by Maastricht honours students 2014

Nanotechnology:

as a case-study to understand the dilemma's of also nuclear science and technology

New risk-handling problem

- There are promising S&T developments that need to proceed
- There are indications of potential hazards, but without firm scientific proof
- Adequacy of current regulations is unclear

Challenge for democracy:

How to democratically govern something that we do not (yet) fully understand?

Dilemma:

Early dialogue with little knowledge

Later policy-making when more is known

Who should be involved?

Societal dialogue

Known risks
(eg. Asbestos)

Uncertain risks
(eg. Nano particles)

Ambiguous risks
(eg. Human enhancement)

Invite:	*Invite:*	*Invite:*
Scientists	**Scientists + Stakeholders**	**Scientists + Stakeholders + Citizens**

Issues in Fukushima?

Known risks
e.g. Radiation diseases

Invite:

Medical doctors

Uncertain risks
e.g. Radiated food crops

Invite:

Medical doctors
+
Patients, consumers

Ambiguous risks
e.g. How to rebuild society?

Invite:

Medical doctors, scientists
+
Patients, consumers
+
Citizens

Experiment with democracy:

it is possible to interact with citizens, patients, consumers, stakeholders!

Netherlands' democratic handling of nanotechnology

- 2004: Rathenau Institute — signalling
- 2005: RIVM — risk assessment
- 2006 (April) : Health Council— state of the art in science
- 2006 (Mei) : Rathenau Institute — expert meeting
- 2006 (Nov) : Government— vision
- 2008: RIVM — risk assessment
- 2010: CieMDN — societal dialogue
- 2012: Health Council— state of the art in science

(nanoparticles in manufacturing)

Dutch Societal Dialogue on Nano

1. Start (March 2009)
2. Stakeholder consultation (May 2009)
3. Dialogue agenda + call for proposals (September 2009)
4. Start projects (January 2010)
   (3 lines: ***information , awareness , dialogue***)
5. Closing projects (October 2010)
6. Final public conference and festival
   (20 January 2011)
7. Public agenda for nanotechnologies presented to government and parliament (February 2011)

Projects *(information—awareness—dialogue)*

- I know nano: Nano in school
- Next Nature: Nano
- Nano Challenge
- Nanotopia?
- Nano Trivia
- Internet panel nanotechnology
- Nano LinX – children debates
- Nano caravan
- Contrasts conference
- Quest Nano Technology
- Joint learning on lab-on-a-chip and bio sensors
- Nano art
- Vignets and scenarios on nano
- Theatre debate Human in the Making
- My Nano Future
- Small... smaller... great!
- Nano discussion online
- Nano Tube
- Teaching module “Is all allowed that is possible?”
- Nano measurement
- Nano on TV

http://www.nanopodium.nl

We tried to make clear choices:

- **Independent organising committee**
  (but weak political mandate?)
- **Broad spectrum of participants**
  (but little attention to key actors?)
- **Externalisation of activities**
  (but lack of quality control?)
- **Broad spectrum of media and means**
  (but lack of focus?)
- **Information—Awareness—Dialogue**
  (but lack of politically relevant questions?)

Results of Dialogue

Dutch citizens:

1. Show increased knowledge about nanotechnology (including the benefits)

2. Better recognize the risks involved

3. Give more support to nanotechnology
   ("as long as scientists and government continue to investigate risks too")

Intermediate conclusion

It *is possible* to discuss
difficult issues of science, technology and medicine

with the general public,

of citizens, consumers, patients, …

Curriculum development
Recommendations

Medical curriculum on multiple dimensions of post-disaster health care

Three lines, integrating STS in curriculum through all years:

1. Courses
(one in every curriculum year)
2. Reflection lectures
(every 6 weeks)
3. Teacher training workshops
(3-day workshops, 2-3 per year)

For example…

Courses
(1 per year)

- Community medicine
- Radiation medicine
- Post disaster health care
- Politics of medicine and health

Reflection Lectures
(every 6 weeks)

- History of medicine
- Philosophy of science
- Sociology of science & technology
- Balancing skills and science in doctoring
- Post-disaster management
- Public understanding of science
- …

Teacher training
(3-day workshops)

- Student project work
- How to stimulate a reflexive attitude?
- How to integrate STS questions?
- How to assess STS student work
- …

In conclusion

Integrating STS in the medical curriculum…

- Provides for better training to cope with post-disaster health & medicine issues *(communication, nuclear fear, lack of trust, …)*

- Makes for better doctors *(reflexive, insight in scientific character of medical knowledge and political dimensions of medical practice)*

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