

Pilotaż kursu online
**„Good Chemistry - Methodological, Ethical,
and Social Dimensions/Implications”**

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Why?



Seveso Disaster

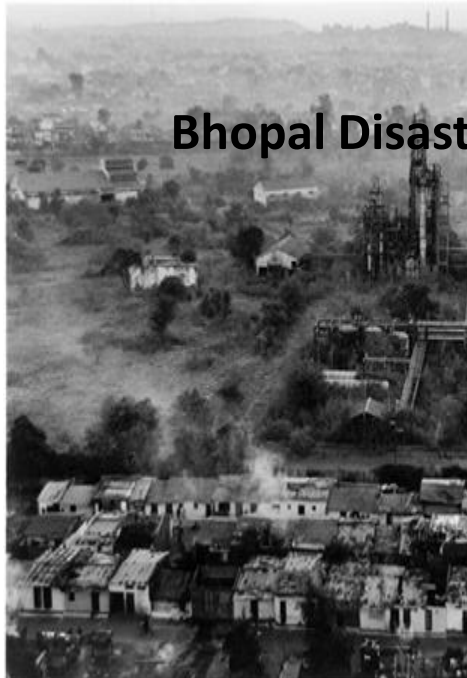
<https://www.thoughtco.com/briefing-the-seveso-disaster-1706806>



Thalidomide

<https://blueocean.net>

<https://www.thoughtco.com/briefing-the-seveso-disaster-1706806>



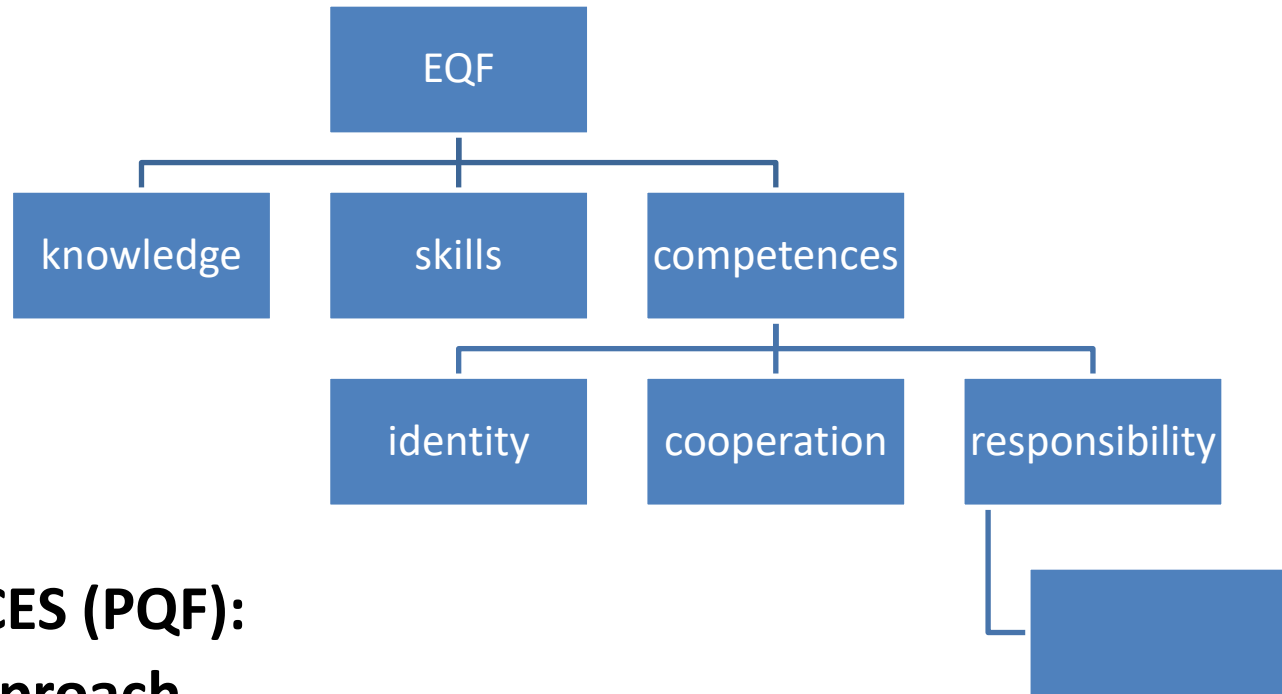
Bhopal Disaster

<https://www.bhopal.org>



<https://www.libyaherald.com>

European Qualification Framework



COMPETENCES (PQF):

- **critical approach,**
- **fulfilling social obligations,**
- **development of professional ethos,**
- **...**



Who and what?

The creation process

- from different views to an agreement

IDEA:

David Cole-Hamilton, vicepresident of EuChemS

EuChemS Working Party on Ethics in Chemistry

CONTENT:

Jan Mehlich (16 video lectures, case studies, tests)

ASSIGNMENTS

EuChemS Division of Chemical Education (DivCEd)

Iwona Maciejowska, Rachel Mamlok-Naaman

European Chemistry Thematic Network (ECTN)

Walter Zeller, Bill Byers, Paola Ambrogi





Bringing Ethics in Chemistry to Universities



DOI: 10.1002/chemv.201800076

Author: Vera Köster, Jan Mehlich

Published Date: 04 wrzesień 2018

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Dr. Jan Mehlich has developed and recorded a unique online class on ethics in chemistry for the master and Ph.D. level. Supported by the European Chemical Society (EuChemS), a test phase for the class will start next winter semester at selected universities.

Related Articles

Magazine: [Critical Thinking Needs to Be Taught](#)

https://www.chemistryviews.org/details/ezone/11095384/Bringing_Ethics_in_Chemistry_to_Universities.html



Basic data

- For MSc and doctoral students
- 16 modules (2ECTS), 5 of them recommended
- on-line course , e-learning platform (Moodle)
EuChemS
- Each modul 2-3 hours of student workload

Modules

- 2 Scientific Inquiry
- 3 The Scientific Method(s)
- 4 Scientific Practice
- 5 Scientific Misconduct
- 6 Scientific Publishing
- 7 Collaborations, Conflicts of Interest, Mentorship
- 8 Academic Freedom, Intellectual Property
- 9 Animal Experiments

- 10 Sustainability
- 11 Science and values
- 12 Responsibility
- 13 Risk, Uncertainty, Precaution
- 14 Science Governance, Technology Assessment
- 15 Science Communication
- 16 Example: Nanoscience

How?

Video

Attributed by whom?

Someone

Legal

- Policy-makers, legislators
- Public, society

Political

- Public (voters),
- Politicians, state representatives

Organisational

- Company directors, CEOs, superiors
- Community (role expectations)

Moral

- Public, society, culture
- Oneself

Trust

Justice

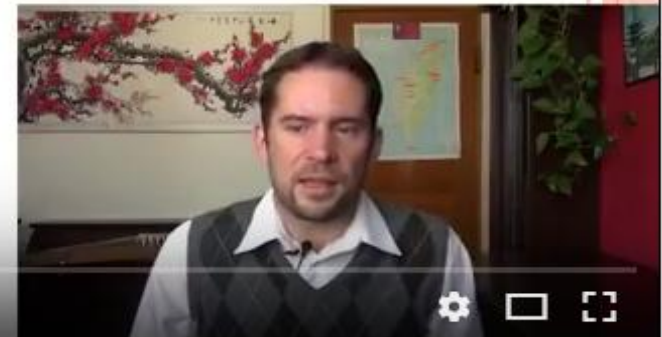
Measures:

Declaratory

Compensatory

Hard treatment

Exclusionary



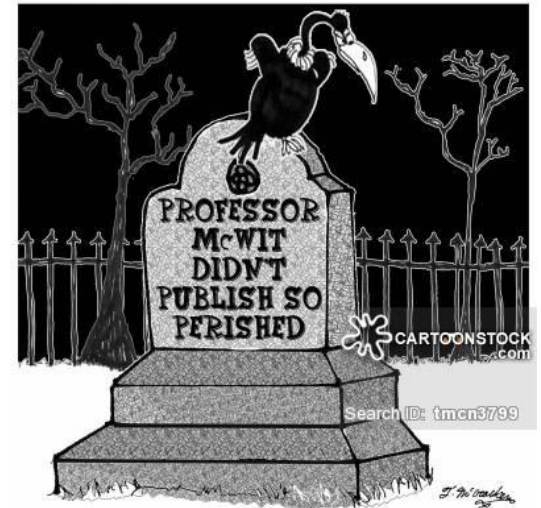
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Chemistry & Ethics: 12 Responsibility

Activities - Voting

Which of following scientific misconduct have you either personally experienced or heard about?

- ✓ **ghost author** - a major contributor is deliberately left off the list of authors
- ✓ **honorary author**- adding to the list of authors an individual who did not merit it/hadn't contributed intellectually to the paper
- ✓ **unjust review** (too good or too bad)
- ✓ **multiply submissions** of the same work to more than one journal
- ✓ **an excess of self-citations**
- ✓ **selective literature search**, ignoraning some important or inconvenient work



<https://medium.com>



Self reflections



<https://pro-papers.com/blog/chemistry-research-topics>

Elements of scientific methodology and projects	Your own project
<ul style="list-style-type: none"> • What is a field of your project? • What is a goal/research question? • Has your research possible application (theoretical, practical)? • Why did you choose such area? 	
<ul style="list-style-type: none"> • What is a main hint you got from reading literature (gaps, relations, trends)? 	
<ul style="list-style-type: none"> • What is your hypothesis? Is it: clear, precise, testable, gives framework of organising the analysis, relates to existing knowledge, 	
<p>Designing a study:</p> <ul style="list-style-type: none"> • What are your independent, dependent, control variables? • Which methods and instruments do you use? Are your familiar with them before the project starts? • Why those? 	
<p>Collection and analysis of information:</p> <ul style="list-style-type: none"> • What are/were (or you predict that will be) your main obstacles in that part of research? • What have you learnt from that? 	
<ul style="list-style-type: none"> • Do the results match your predictions? • Have you confirm or denied your hypothesis? • Have you find any new correlation, dependence? • What kind of new questions appeared? 	
<ul style="list-style-type: none"> • Have you already presented any part of your research to somebody else (supervisors, students, other researchers – a 	



Fora



<https://1918.me/cheating-advantage-business/>

Warm-up activity

Does everybody cheat?

Identify and briefly describe an exemplary case of fraud. (...) Suggest **likely motives of the perpetrator/perpetrators, explain how the fraud was detected, and outline its consequences.**

Fill Pielke's description of **4 types of scientists/engineers in policy-advising:**

- pure knowledge exponent,
 - advocate,
 - arbiter,
 - honest broker with life by the example **of plastic pollution of the ocean.**
- Imagine a political or public panel that asks for scientific advise on how to tackle this problem. **What would the four different characters reply** (in principle, not in scientific detail)?



Case study

Read the this encyclopedia article about the Russian **biochemist Trofim Lyenko**. Discuss his case along the following questions: What do you consider **the main reasons for his research programs to fail**? In which way was his understanding of science corrupted by politics, and what should he have done instead?



A major fault, for example, is the fact that, along with the materialist principle, Darwin introduced into his theory of evolution reactionary Malthusian ideas.

— *Trofim Lyenko* —

AZ QUOTES

https://www.azquotes.com/author/47335-Trofim_Lyenko

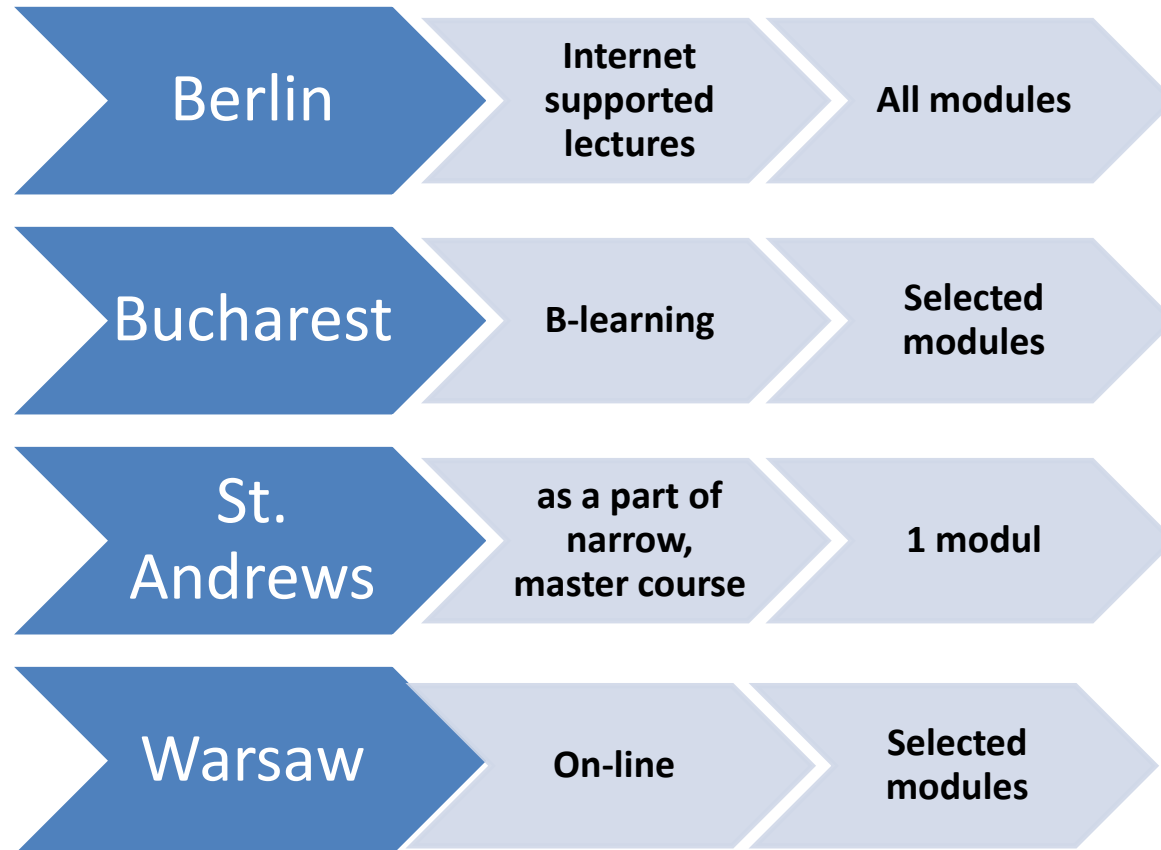
- Calabrese case
- Baltimore case
- Bengü Sezen case
- Robert Millikan case
- Arthur Galston (Agent Orange)
- Nanopil project (Lucivero)

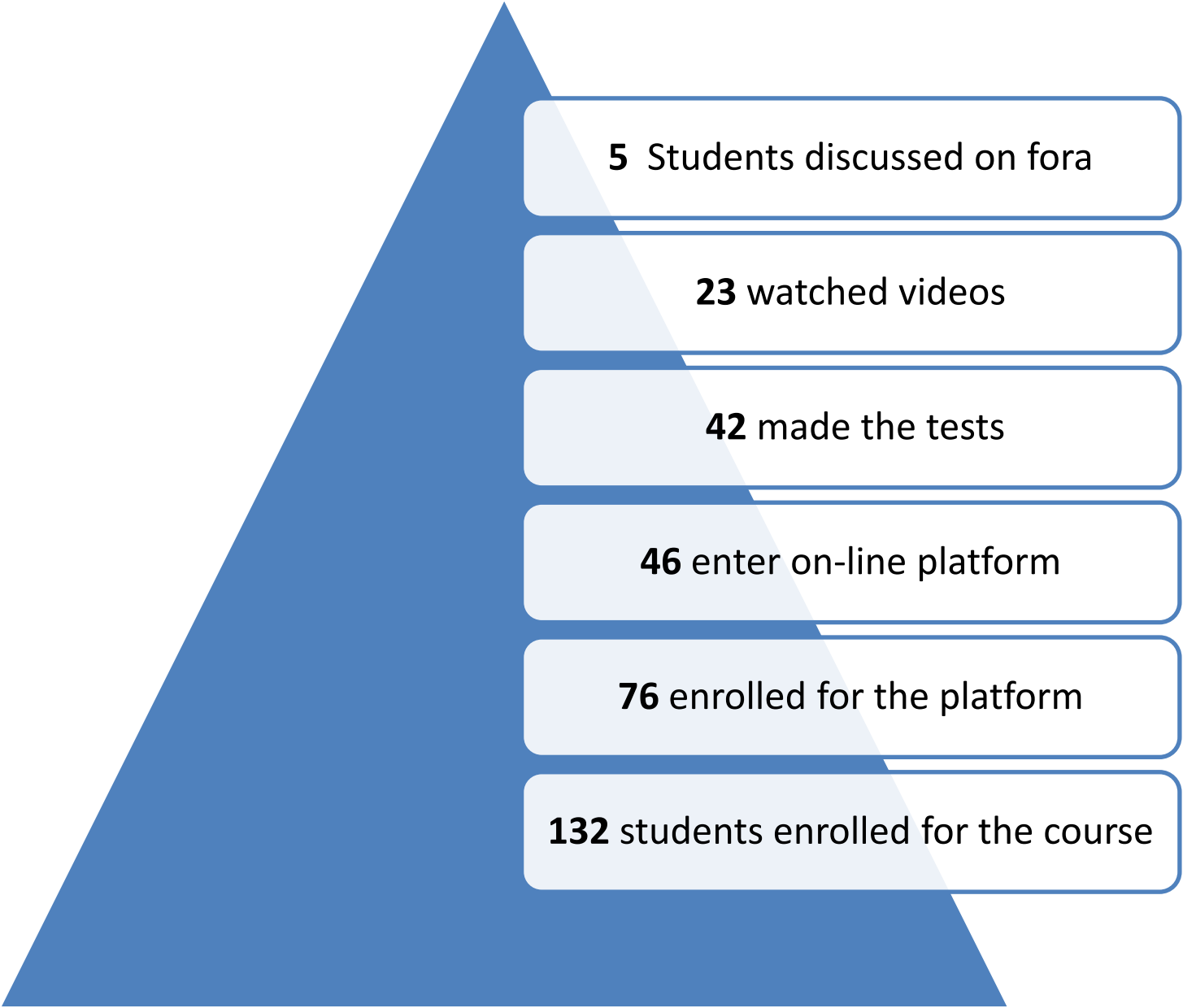
Piloting phase 2018/19

PILOTING PHASE



Variety of formats





Evaluation – Teachers (1)

...make the students to think about sustainability, which unfortunately is none of their first concern.

Examples of ethical scenarios were a good source of discussion.

... helped show that ethical issues are more common place than they originally thought.

Many of the examples will be retained by the students

Talking with them face to face, made me realize that they became more critical with themselves and others.



Evaluation – Teachers (2)

The PhD students believe that it is suitable for PhD students, but perhaps not appropriate for master students.

The tests is more easy to use online, and to quantify. The oral exam is better in term of discussion.

It was difficult to gather all the students in one place at the same time, therefore some of them join the offline class, the others visualized the available online materials.



Evaluation – doctoral students

+	-
It was science of different dimension, than any experienced so far	Sometimes it was difficult to understand terminology
The course 'Good Chemistry' changed me a lot	The interaction was rather limited, this was missed.
I think it should be obligatory course for all the students	Some articles or scripts were far too long



New edition – Autumn 2019/20

- a) On the EuChemS platform (individual or groups of students)
- b) Copy to your own university e-learning platform

Ask EuChemS office for an access to the platform/course

secretariat@euchems.eu



„TEACHING IN UNIVERSITY SCIENCE LABORATORIES. DEVELOPING BEST PRACTICE” MOOC

starts

14th October 2019, on Coursera

Motivation

Key learning
theories

Skills and
strategies

Questioning
and
instructions

Assessment,
feedback and
self-reflection

Case studies