

What is *epistemological responsibility* – and how can we teach it?

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Chair: *Philosophy of Science in Practice*

What is epistemological responsibility?

what are other
words for
irresponsible?



reckless, feckless, careless,
thoughtless, unreliable,
devil-may-care, undependable,
untrustworthy, unaccountable



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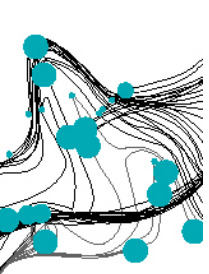
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What is epistemological responsibility?

- Researchers and professionals make epistemic (knowledge) claims.
- They are the experts that others (non-experts) must be able to rely on. Others must be able to trust these epistemic claims.
- That is why experts bear responsibility for their epistemic claims, i.e., *epistemological responsibility*.
- Why is this so?



What is epistemological responsibility?



1. Researchers and professionals make epistemic (knowledge) claims, based on which decisions are made that have consequences for other people & society.
2. They are the experts that others (non-experts) must be able to trust. They are *not* responsible for the (social) consequences of decisions that are beyond their reach. But they do bear the responsibility for the *relevance* and *reliability* of conclusions that can be drawn (esp. regarding foreseeable issues) on the basis of their knowledge claims.
3. That is why they bear responsibility for their epistemic claims. Others will derive / deduce conclusions based on these claims.

Ethics



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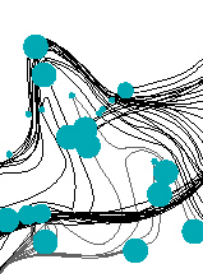
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What is social responsibility?

- Epistemological responsibility (responsibility for knowledge claims) is a specific interpretation of **social responsibility** that fits the role of experts and the way in which experts should be **ethical**.
- **Social responsibility**: individuals are accountable for fulfilling their civic duty; the actions of an individual must benefit the whole of society.



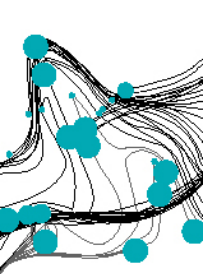
Example of the epistemological responsibility of an expert



A medical doctor bears epistemological responsibility for the *diagnosis* and *treatment plan* of a patient. How is this so?

- Diagnosis and treatment plan are **epistemic claims** concerning the patient.
- In diagnosis, we expect that doctors **gather relevant information** about the patient, (a) by interviewing the patient, (b) diagnostic tests, (c) professional knowledge and literature search;
- and **integrate this information** into a coherent whole (a 'picture' or a 'model' of the patient.) on the basis of which the doctor comes to a *diagnosis*.
- Same for treatment plan.



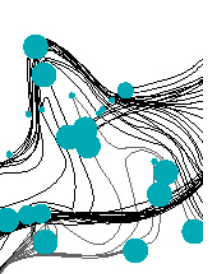


Example of the epistemological responsibility of an expert

A researcher or engineer bears epistemological responsibility for, e.g., knowledge claims about materials. How is this so?

- They aim to develop material properties that must meet relevant criteria: functionality, safety, durability, sustainability, sensitivity, specificity,
- In *design-concept* of material, we expect that experts **gather relevant information** about the material, (a) by investigating use-context, (b) using professional knowledge and literature search, (c) proper research and tests.
- and **integrate this information** into a coherent whole (a model of the material properties) on the basis of which experts come to recommendations.

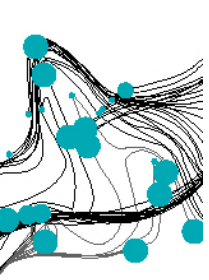




Conclusion and Take home message



**Epistemological responsibility
concerns
research methodology**



References

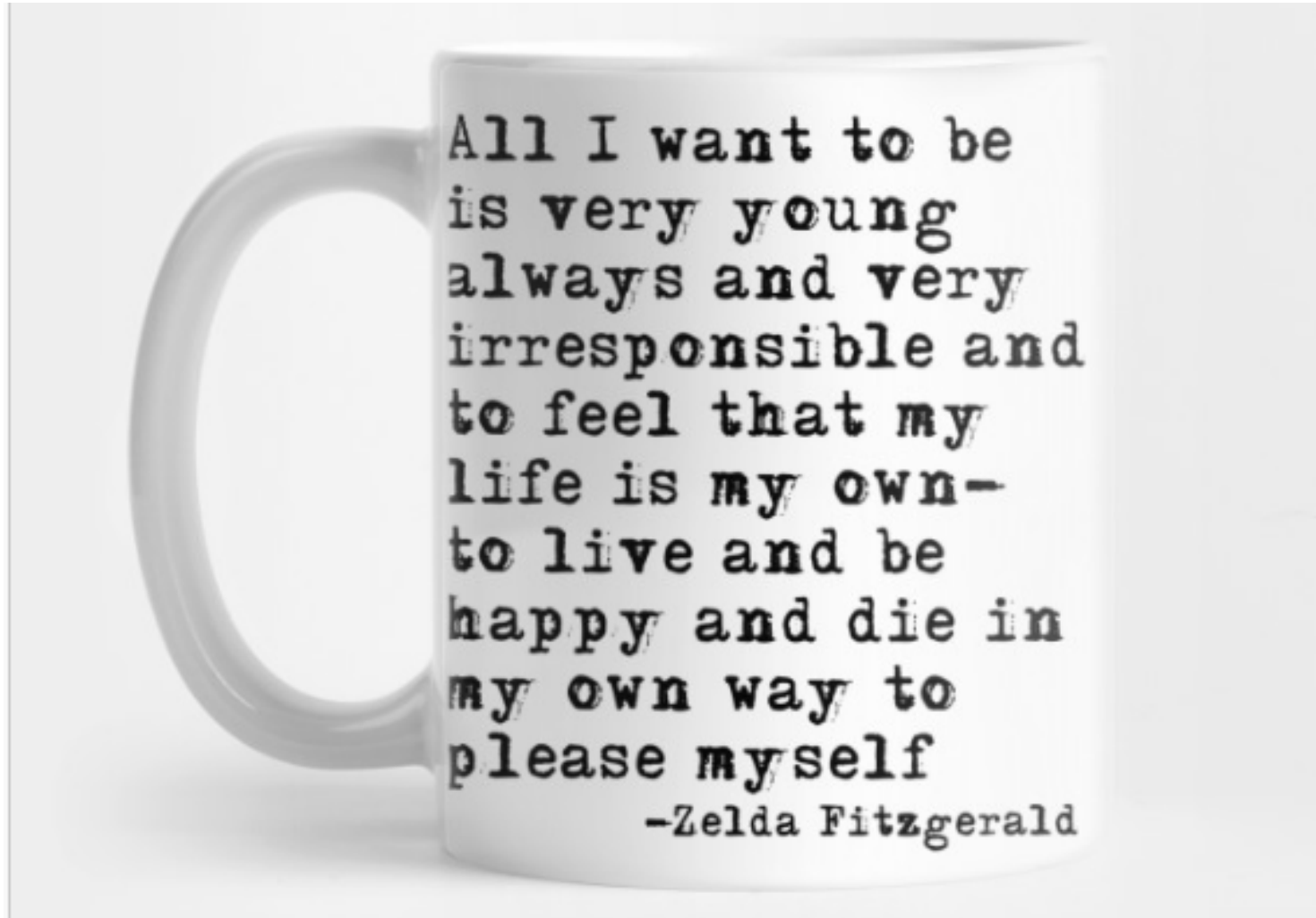
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Boon, M. (forthcoming). **Scientific methodology in the engineering sciences.**
In: *The Routledge Handbook of Philosophy of Engineering*. D. Michelfelder &
N. Doorn (eds.).



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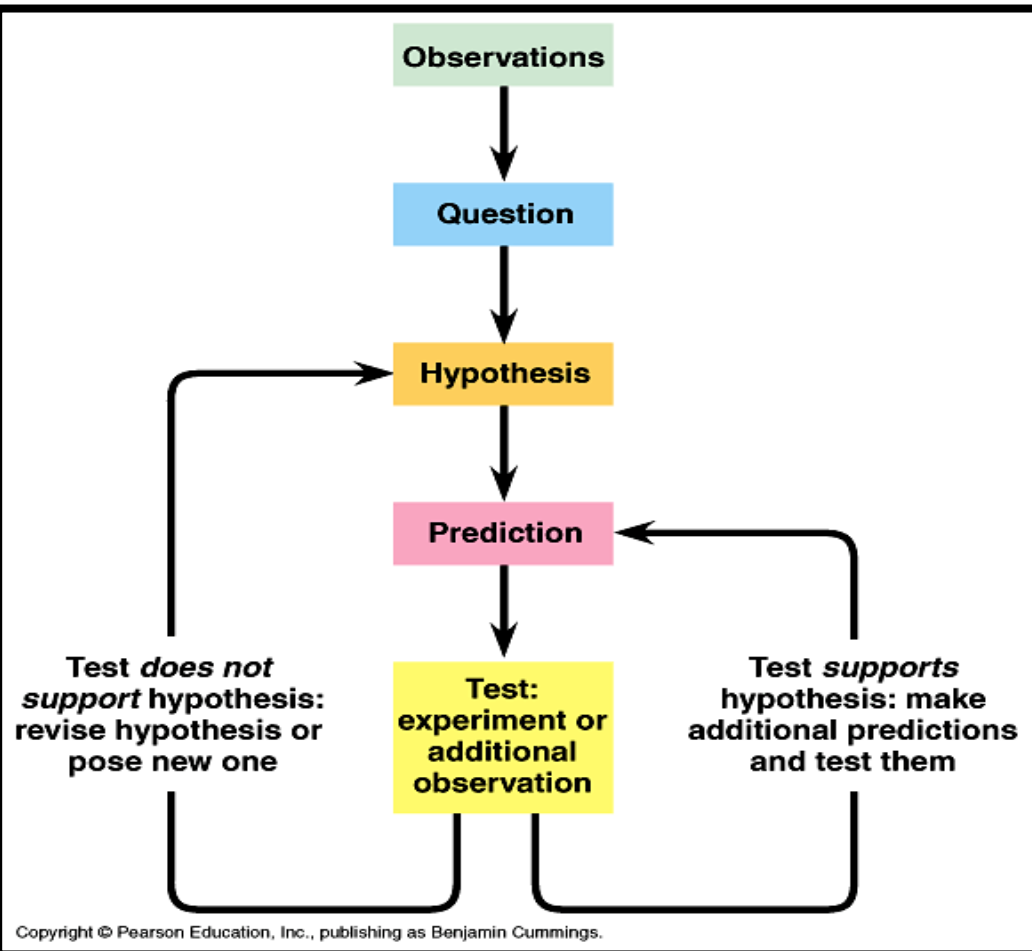


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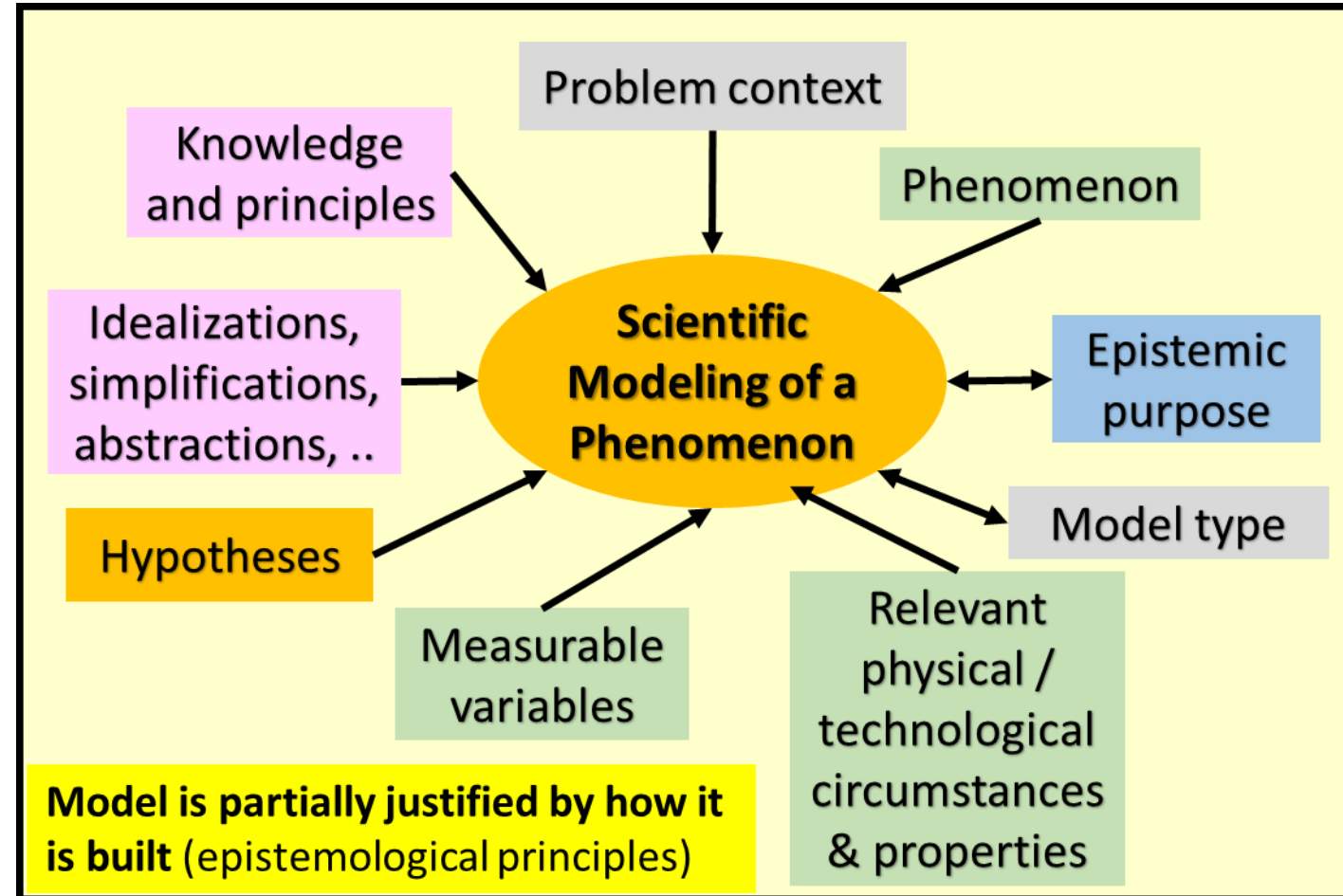
- TOM: Twents Onderwijs Model
- PBL (problem or project based learning) – Lacks scaffolding of how to **apply** science in **problem analysis** and solution.
- ATLAS university college (2nd year): Educational innovation to train *academic* skills in project: Focus on **research methodology in problem-solving context** + Reflection task on taking **epistemological responsibility** for result.
- Biomedical Engineering (1st year): Educational innovation to train *academic* skills in project (design Biomaterial): Focus on **conceptual modeling** as a scaffold for learning to apply scientific knowledge in developing design-concept.

Methodology of scientific modeling

HD method in natural sciences



B&K method for (re)constructing (scientific or engineering) models



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Conclusion and Take home message

Epistemological responsibility concerns **research methodology**, which involves **decisions** all the time:

- Requires **reflection** on *effective, adequate* and *relevant* uses of scientific knowledge and methodology,
- Requires **rethinking** *how to teach this*.
- This may touch deep philosophical beliefs about science.

References

Available from my Research Gate



Contents lists available at [ScienceDirect](#)

Progress in Biophysics and Molecular Biology

journal homepage: www.elsevier.com/locate/pbiomolbio



An engineering paradigm in the biomedical sciences: Knowledge as epistemic tool



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