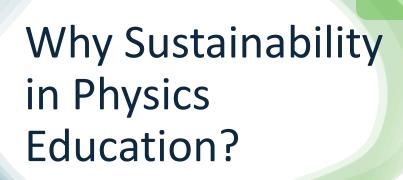


Sustainability in Physics Education for BSc/MSc

Tomoko MURANAKA, PhD

EFPL



Urgent research topics! : Energy, Pollution, Water, ...

Deep understanding of nature



Transversal skill: required by society



Responsibility: major consumer of planet's resources.

Mandatory course of general sustainability:

• University / Faculty level of coordination.

Optional course:

- Study plan is already FULL
- Courses are "packed" for specialisation.
- Add-on to existing courses:
- Proper materials and contents are required.

How to integrate to the courses and what are Challenges?

Student's Voice

"Do you have any suggestions on how this course could further integrate aspects of sustainability (environmental or societal)?"

- No sense. This is pure physics course!
- It's already the case. It's enough.

- Stop printing exercises. We can see online.
- More natural light in the room
- Less air conditioner

- Add sustainability contents in exercises
- Simulate forest fire
- Al safety, data centre operation and its impact
- Thermodynamics by case study
- Wind turbine, PV as TP topics with a clear sustainability context
- LN2 usage (some students play with it!)

Talk about environmental cost when compare different technologies

• More female course assistants

Opportunities and needs for lecturer's

- Material Sharing platform
 - Sustainability context and contents of lab & programming exercises (PV, Heat Pump, ...).
 - National level exchange which permits a development of educational contents based on local data (ex. MeteoSwiss Open Government Data (OGD)).
 - Contents developer's visibility increases.
 - SPS could help?
- Option: Project based course
 - Field work, ex. Physique dans la Forêt, F. Bouquet, Univ. Paris-Saclay

References

- Nature Series: Physics and Sustainability https://www.nature.com/collections/egagaacfba
- Singh, V. How to teach climate change in a physics classroom. *Nat Rev Phys* 5, 200–201 (2023). https://doi.org/10.1038/s42254-023-00573-4
- Sustainability Education 101 self-learning course https://sustainability-education-101/
- Physique dans la Forêt, F. Bouquet, Univ. Paris-Saclay https://qpes2023.sciencesconf.org/444090/document