Queen Mary University of London

Why do we need sustainability in mathematics ?

"Since the introduction of the UN Sustainable Development Goals (SDGs) in 2015, universities have struggled to integrate sustainability into mathematics education. "

Why is this a challenge for universities?
Universities struggle to incorporate sustainability in mathematics since it is frequently viewed as 'abstract', 'theory-driven subject with few direct connections to real-world issues.

So, this needs to change!
According to a report from the American Mathematical Society, sustainability should permeate mathematics curricula at high school and university levels. We have been applying sustainability in mathematics unconsciously e.g., when tackling energy optimisation. It is crucial, that students increase their awareness to enhance their mathematical and sustainability understanding.

Why should STEM programmes help students understand environmental, social, economic issues related to sustainability development?
These fields play a crucial role in sustainability-related issues. By integrating sustainability, STEM education can provide students with the skills necessary to create innovative solutions that will enable a sustainable future to be achieved..

How can we integrate sustainability into university-level mathematics?

- **Interweaving into existing course material:**

Sustainability can be integrated into STEM by incorporating real-world relevance to current settings. The 'micro-insertion' strategy strengthens the curriculum without replacing fundamental content.

- **Integration in a seamless and organic manner:**

Integrating objectives sustainability into mathematics requires significant consideration to ensure that it feels natural rather than artificial. The primary focus should be on student engagement, with sustainability occurring naturally from the mathematical principles rather than as an add-on component. This can be attained by linking problems with real-world scenarios

- **Subjective and reflective aspects:**

Sustainability questions will frequently involve open-ended discussions, which encourage deeper reflection from both students and instructors. Unlike the objective problems with clear answers, solutions can vary and evolve over time.

- **Links with the UN Sustainable Development Goals**

Sustainability concepts in math problems can be linked to the 17 UN SDGs (shown below), giving students with a more holistic view of sustainability within STEM. This helps connect technical learning to real-world sustainability objectives.

What are UN sustainability development goals?

The Sustainability development Goals (SDGs) represent a global initiative to eradicate poverty, safeguard the environment, and enhance the well-being and future-prospects of people worldwide. Adopted by all United Nations Member States in September 2015, the SDGs area key component of the 2030 Agenda for Sustainable Development, which outlines a 15-year framework for achieving these goals and their associated targets (United Nations, 2022).

References: United Nations (2018). Sustainable Development Goals (SDGs) and Disability | Division for Inclusive Social Development (DISD). [online] social.desa.un.org. Available at: https://social.desa.un.org/issues/disability/sustainable-development-goals-sdgs-and-disability.