Classroom

In this section of Resonance, we invite readers to pose questions likely to be raised in a classroom situation. We may suggest strategies for dealing with them, or invite responses, or both. “Classroom” is equally a forum for raising broader issues and sharing personal experiences and viewpoints on matters related to teaching and learning science.

Integrating Climate Change Education Across the Curriculum

A team working from IISER Pune, India has developed teaching resources to integrate climate change-related topics with the core curriculum at school and/or undergraduate level to increase the awareness of cause and effect of climate change among students. Their work is part of the global vision to democratise knowledge such that all of humanity would invest their talent, skills and ambition in a focused way to address the problems of climate change, which requires locally-rooted solutions, but based on global science.

Climate change is one of the most significant issues that can affect the sustainable and equitable development of all countries and their citizens. The impacts of climate change include acidification of oceans, melting of glaciers, rise in sea level, loss of biodiversity, extinction of species, threats to food security, spread of infectious diseases, and other serious problems that are not restricted to a single country or region, but pose challenges globally.

Solutions to mitigate the impact of climate change has to be identified and implemented at local levels, as no one solution would

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fit all regions of the world. This means every citizen must be aware of the causes and effects of climate change. Such an increase in awareness, understanding, and knowledge of the science of climate change can be achieved effectively by introducing relevant topics in the formal education system. Maximum reach and impact of these learning opportunities can be targeted through pedagogical intervention in the form of new educational modules on climate change that can be integrated with the existing, core curriculum in any discipline/subject at the high school and undergraduate/college levels.

A major global effort in this direction is being implemented from India. Commonly known by its acronym TROP ICSU, this pedagogical initiative aims to seamlessly integrate climate change-related topics with core curriculum at the high school and undergraduate levels to increase the awareness of the causes and effects of climate change among students. This educational project aligns with the vision of democratization of knowledge by enabling current and future citizens to invest their talent, skills, and ambition in a focused manner to address the problems of climate change, which require solutions that are locally rooted but based on global science. High-quality teaching material is provided to teachers, thus empowering them as agents of change.

The TROP ICSU project implementation team based at IISER Pune has developed, collated, curated and validated a repository of novel teaching resources from across the world that can be used by teachers to teach discipline-specific topics in science, mathematics, humanities, and social sciences using examples, case studies, and activities related to climate change. Thus, the project directly aligns with the United Nations Sustainable Development Goals (UN SDGs), specifically with SDG 4 (Quality Education) and SDG 13 (Climate Action).

The teaching resources are of two types: teaching tools and lesson plans (please visit URL: https://tropicsu.org; https://climatescience-teaching.org/ for more details). Teaching tools are typically computer-based tools such as interactive visualizations, video micro-lectures, models/simulators, and classroom/laboratory activities that are
The quality of life of future generations is largely dependent on the quality of education that we impart to today's students. Educational methods are more effective when students are challenged to identify the cause and effect of a problem that they can relate to their life.

Climate change is considered to be the most critical factor affecting sustainable and equitable development, increasing conflicts, and causing massive extinction of species. Addressing the climate change issue is an essential step toward achieving the Sustainable Development Goals (SDGs). As the impact of climate change is inseparable from our day-to-day life, now and in future, it is both a problem to be addressed and a problem that can be adopted for more effective teaching.

categorized by discipline, tool type, grade level, climate topic, language, and region, thus allowing teachers to choose a suitable tool based on their preferences and requirements. Lesson plans consist of a set of teaching tools (typically for an introduction, central activity, conclusion/further exploration) and a detailed step-by-step guide for the usage of these tools. Sample evaluation questions and learning outcomes are also provided. These lesson plans are categorized according to the discipline of the main curricular topic; they can be used independently or integrated with a lesson plan that is already being used for the curricular topic by the teacher.

The team has travelled to several locations within India and other countries to brainstorm with local experts on climate change and
also with local educators to evaluate the effectiveness and ease-of-use of these teaching resources. The implementation team has established strong ongoing collaborations with United Nations (UN) organizations such as UN CC: Learn, the World Meteorological Organization (WMO), and the World Climate Research Programme (WCRP), who have validated and endorsed these educational resources.

The project has demonstrated a novel pedagogical approach of integrating climate change education with the existing curriculum. By adopting this approach, teachers can continue to teach topics in the existing syllabi of their countries, while equipping future generations with the vital skills required for climate change adaptation, mitigation, and resilience. Further, teachers are introduced to the use of digital pedagogy and an integrated, multidisciplinary approach to teaching topics in climate science and climate change. Such a method that uses engaging, hands-on and interactive educational resources will also help students develop other transferable skills such as analytical ability and critical thinking.

Suggested Reading

[1] https://tropicsu.org/