

Climate change education effects on worldwide schoolchildren and their entourage: a systematic review

November 2023 – No. 65 | AFD / ECO-EDU Systematic Reviews Education and Climate Change

PITCH

This systematic review¹ (SR) explores the effects of climate change education (CCE) on the knowledge, attitude and behavior of schoolchildren and their surrounding communities worldwide.

CCE enhances knowledge complexity and awareness of schoolchildren own contribution to climate change (CC), and helps shape pro-environment commitment, and engagement in more sustainable practices. CCE also improves self-efficacy, concern, and attitudes towards the environment among parents and teachers.

A comprehensive and evidence-based educational framework has to be developed for the local appropriation of educational knowledge and strategies. To adjust to the complexity of the challenge and urgently meet climate commitments, an interdisciplinary community of CCE practices needs to foster culturally sensitive and context-specific CCE.

CONTEXT & MOTIVATION

The Paris Agreement on CC incites all parties “to enhance CCE training, public awareness, public participation and

public access to information”. Despite the longstanding call for environmental education, its integration into mitigation and adaptation policies remains insufficient and lacks evidence-based practices for changing behavior. While there is a growing body of knowledge on CCE interventions, this is scattered across fields, making knowledge integration and systematization a difficult task. This SR evaluates the effects of different types of curriculum-based and extra-curricular interventions on cognitions, attitudes and behaviors of school-aged children and their entourage, across various socio-demographic groups.

METHODS

The SR explores qualitative and quantitative studies published until Q1 2023, in 13 databases and 5 different languages, focusing on the impact of CCE interventions targeting schoolchildren aged 5 to 19 years and their entourage. A rigorous search strategy including double-screening across more than 10870 publications resulted in a final selection of 146 articles, the most important number in this field until now.

Most studies are published since 2012 and are mainly conducted in North America (USA), Europe and Central Asia (China and Turkey), with a lower presence of low- or middle-income countries (LIC/MIC). The small number of publications from Africa, South Asia and South America as well as the lack of NGOs publications is explained by the eligibility criteria of the SR (studies should have measurable interventions or outcomes). There are 20 times more studies about mitigation than adaptation. Only two studies (1%) focus on rural areas of developing countries.

RESULTS

Studies addressing cognition outcomes (knowledge and awareness), and especially those addressing knowledge, are clearer and more predominant than those on effects on emotions and intent (attitudes) or habits and actions (behavior), which illustrates the so-called ‘knowledge-behavior gap’. Studies addressing behaviors represent only 10% of all the outcomes studied. Comparatively more studies from MIC measure behavior effects, while all studies from LIC measure exclusively cognition.

Authors Marius BOTTIN, Ana Beatriz PIZARRO, Sara CADAVID, Luisa RAMIREZ, Sergio BARBOSA, Juan Gabriel OCAMPO-PALACIO, Benjamin QUESADA, Cecilia POGGI, Linda ZANFINI.

Geography Multi-country

Key words Climate change education, mitigation, adaptation, systematic review

Themes Education, Climate change, Natural science, Psychology

Find out more about this project: <https://www.afd.fr/en/carte-des-projets/assessing-impacts-education-climate-change>

While there are no age-based results concerning the different effectiveness of CCE interventions (see Fig.1), intergenerational learning is a promising method for overcoming social or ideological barriers to climate concerns and give way to positive outcomes, especially in terms of knowledge and intentions.

Research is clearly exploring new theoretical frameworks, pedagogic strategies, tools, and scientific methodologies, demonstrating a high degree of adaptability and innovation.

The great majority of studies reports having positive effects on participants, suggesting that interventions can improve cognition, attitudes and behaviors, but also a high publication bias (negative results are less submitted or published). Practical toolboxes (i.e. projects, games, science club) allow better youth's science involvement and concern, while transversality (translation of CC to other disciplines) improves awareness and intent. However, it is difficult to evaluate what "works well" on behavior or habit, as studies usually focus on knowledge or willingness-to-act, or are performed shortly after the intervention.

Some studies (16%) compare pedagogic elements to **identify best practices**: student-centered pedagogies perform better than traditional education, for both knowledge and awareness. Constructivist approaches actively involving students provide better results than teacher-centered pedagogies for students aged 11 to 18. Pedagogies with emotional engagement appear improving knowledge, awareness or intent concerning CC better than traditional interventions. Pedagogic activities allowing students to grasp the complexity of CC issues appear also more effective. Intervention design tweaks can have strong consequences on the final pedagogic outcome with little effort (e.g. change order of activities between theory and practice).

Effectiveness depends on how emotions are harnessed and managed: Optimal results require balancing between raising awareness of the urgency of the issue and providing individuals with the tools and motivation to take meaningful action. Strong empathy towards nature, engagement in meaningful action and problem-solving increase CC-related long-term behavior. Positive emotions, particularly hope, favor climate-friendly behaviors. Negative emotions (e.g. fear or anger) are associated with more complex thinking, but tend to dampen positive outcomes for CC behaviors. Competition (vs. collaboration) is counterproductive. Self-efficacy is a fundamental psychological driver of individual and community responses to fight CC if complemented with social coordination (consistency of behaviors among a social group) and positive attitudes.

Fig. 1 – Schematic representation of promising interventions, research gaps and recommendation for actions



RECOMMENDATIONS

- ▶ CCE interventions should systematically include student-tailored analyses. Preference should be given to transversality of disciplines and locally-relevant experiences, being impactful on knowledge, attitudes and possibly behaviors.
- ▶ Interventions strategies should balance between raising awareness and providing the tools and motivation to take action. They should leverage on positive emotions and collaboration.
- ▶ Innovative pedagogies (constructivism, multidisciplinary, collaborative approaches) perform well. In emotion-based interventions, it is important to account for the emotional maturity of participants in conjunction with questions, concerns, and misconceptions.
- ▶ Empowering teachers is key to ensure their commitment. In addition, intergenerational learning is promising for overcoming social or ideological barriers.
- ▶ International efforts are needed to standardize evaluation and analysis methodologies, to define CCE gold-standards. This implies facilitating publications on “what does not work” and differential results about gender, ethnicity, age, rural and socio-economic factors.
- ▶ Educators, researchers and policy makers should collaborate at global and local scale to develop (1) education policy promoting local and contextualized appropriation of global CCE guidelines, (2) a set of standards to evaluate CCE interventions and monitor global progress on the implementation of successful strategies, (3) a set of instruments to allow global comparisons, and support local teams to construct instruments to monitor local progress.

¹ Bottin *et al.* (2023). “Worldwide effects of climate change education on the cognitions, attitudes and behaviors of schoolchildren and their entourage: a systematic review”, AFD Research Paper no 299.