

Israel Ministry of Education's Role in Leading the Development and Implementation of Climate Change Curriculum

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Israel Ministry of Education acknowledges its role and responsibility in leading the development and implementation of climate change (CC) education across the Israel K-12 curriculum. Over the past ten thousand years our world has enjoyed a largely stable climate that protected humanity and allowed it to prosper and advance alongside Earth's other species (Rockström, 2010). Unfortunately, this comfortable state of existence is rapidly changing in front of our eyes. It is clear now that CC catastrophes are unavoidable, and that CC related disasters which are already becoming a permanent feature of people's lives across the globe, will continue to increase in magnitude and frequency (The Intergovernmental Panel on Climate Change [IPCC], 2022).

On the backdrop of these rapid changes, the Israel Ministry of Education places itself at the forefront of efforts to prepare our children for living in a changed climate. Students today need to be equipped with a new set of knowledge and skills that will enable them to grow and flourish in a world different than the one we knew, less stable and less predictable across all the interconnected systems of environment, economy, culture and society. It is projected that no system on Earth will remain untouched by CC (IPCC, 2022).

Accordingly, since early 2022, the Ministry of Education in collaboration with the Ministry of Environmental Protection, have been undertaking an extensive educational reform aiming to design, develop and implement a new CC curriculum. The project has been progressing simultaneously in multiple pathways, including: (i) the establishment of multi-disciplinary and multi-sectorial teams working in developing a shared strategic program; (ii) operation of a curriculum development team; and (iii) the construction of a new Centre for Teacher Professional Development in CC Education. Additionally, teams at the Ministry are working to develop state-of-the-art CC educational resources that are already available for teachers on a new dedicated CC portal. In addition to the extensive consultations with CC academic experts, the Ministry's work is also informed by systematic literature review aiming to map out the state-of-play worldwide and learn from other countries' experiences.

The systematic literature review was useful in revealing that many countries across the globe are currently grappling with questions related to introducing CC into the curriculum. However, thus far it seems that CC is mentioned in the curricula of only 53% of countries, where in most curricula CC

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appears in a shallow way, lacking depth and breadth, characterised by fragmentation (UNESCO, 2021a,b). Furthermore, it was found that most educational policies are lacking in action plans; curriculum frameworks; implementation mechanisms; allocation of responsibilities; and monitoring and evaluation (Laessøe & Mochizuki, 2015). Some exceptions were found, such as the New Jersey K-12 CC curriculum (New Jersey Curriculum, 2020). Overall, the findings suggest that Israel is currently one of very few countries and states working to develop a comprehensive strategic plan for including CC across all the years of schooling. As such, it is required to forge a way with little pre-existing experiences to rely on.

In the absence of empirically tested best-practices in CC curriculum development, the Ministry of Education has developed a set of principles to guide its approach to CC curriculum development. The first principle is that the curriculum needs to rely on evidence-based educational theories and practices, rather than trial ideas that their effectiveness is unknown. Accordingly, the development process draws upon theories in epistemic cognition (Chinn et al., 2011), Cognitive Load Theory (Sweller et al., 2019), Curriculum Theory (Biesta, 2022; Young, 2013) and other theoretical frameworks concerning curriculum, teaching and learning.

The second principle entails dissociation of CC education from Sustainability education. This means that CC curriculum is developed independently from educational approaches such education for sustainable development (ESD) and global citizenship. There are many reasons underlying this decision. While it is beyond the scope of this paper to lay out all the reasons, it is sufficed to state here that one of the main problems with the ESD framework is the lack of clear contents, structural organisation of ideas, conceptual inconsistencies, and evidence suggesting poor implementation outcomes (Eilam, 2022; Niebert, 2019). Overall ESD is perceived as an agenda concerning the major global challenges, rather than an organised body of knowledge that may be translated into a workable curriculum. Consequently, Principle 2 directs that the scope of CC contents will be determined in alignment with the IPCC conceptualisation (IPCC, n.d.). Accordingly, eight CC themes were identified as forming the basic structure of the curriculum. These include: Observed changes in climate; drivers of CC; future CC; risks and impacts; adaptation and mitigation; socio-economic; policy and governance; and ethics.

The third principle is the integration between teaching CC as a topic on its own right and implementing CC in a cross-curriculum approach. Teaching CC as a topic on its own right allows the integration of the information, addressing complexity and systematic evaluation. The cross-curriculum approach provides opportunities to extend the scope of learning, forge new connections between various fields of knowledge and apply CC knowledge in new contexts. CC as a topic on its own right will be taught in Years 8 and 10, by dedicated teachers who specialise in CC education, with 30 hours allocation in each Year level. In the 8th grade, CC is taught in Geography and in the 10th grade in Science. As a cross-curriculum approach, CC is allocated with 30 hours of teaching in each Year level across K-12. Here CC is included in a range of subjects across the curriculum in each year level.

Climate Change Learning Outcomes

- Develop knowledge skills and values as an outcome of direct student engagement with CC education
- Develop system and multi-system conceptualisation of CC locally and globally
- Develop student agency through participation in innovative projects addressing CC challenges, with the aim of contributing positively to the society and the environment.
- Develop personal and social resilience
- Apply authentic learning addressing big ideas and the application of real-world solutions

- Develop CC related disaster risk reduction preparedness

Implementation strategies

The following implementation strategies are currently being applied:

- Updating and developing new educational programs, resources and assessments
- Implementing CC across all the curricular subjects and as an independent topic
- Developing and implementing in-service teacher professional development programs
- Integrating CC in Social Education, including the development of opportunities for students to initiate and take part in CC projects and CC educational excursions
- Include CC in pre-service teacher training courses and in courses for development of educational leadership.
- Prepare the educational system as a whole for disaster reduction according to the guidelines developed by UNESCO & UNICEF (2014) and UNICEF (2019).

The Pedagogical Secretariat at the Ministry of Education is currently completing Phase 1 of its preparation and is ready to move into Phase 2, where CC education will be formally implemented across K-12. This process is gradually taking place across 2022 and will be finalised in 2023.

Important to note is that CC contents will be adapted to students' developmental stage according to the advice of the Ministry's mental health experts. Careful attention will be given for balancing between developing students' resilience while refraining from inadvertently causing climate anxiety. There is strong evidence suggesting that social education, activism, community participation and cultivating student agency, play important roles in increasing resilience, a sense of belonging and care, while minimising climate anxiety. The Ministry of Education will continue promoting students' active participation and involvement in their communities. Pedagogies such as experiential learning, outdoor excursions, project-based and inquiry-based learning are perceived as integral to CC education.

Teacher professional development will take place through diverse approaches. These include professional communities of practice, formal and informal professional development programs. Tailored on-time support will be given to teachers through local school guides. The target audience include all pre-service and in-service teachers and educators.

Schools will be required to develop CC school plans, taking into account the local school needs, available resources and school community. Each school will establish an interdisciplinary CC leadership team to oversee the CC curriculum implementation. The school leadership team will be responsible for planning CC activities, organising students' participation in local and national projects and activities concerning CC, involving students in community projects, supporting teachers' professional development, and other initiatives as appropriate for each school.

In summary, the Israel Ministry of Education has identified the urgent need to develop a national CC curriculum. In following this call, over the past year, the Ministry has been working to develop state-of-the-art CC curriculum, based on evidence-based educational theories and practice. Its first and foremost aim is to ensure that the national CC curriculum not only promises, but also delivers. We believe that preparing our students to grow and thrive in an era of CC should be a prime goal for Ministries of Education worldwide. We hope that the experience and know-how developed in Israel will be useful for other countries that are undertaking similar curriculum reforms.

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