

Climate literacy: concepts, dimensions and significance

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This article summarises the central ideas of the concept of “climate literacy” and its significance for climate-positive action.

The concept of “climate literacy” emerged in scientific discourse in the mid-2,000s, mainly in the field of education (Azevedo & Marques, 2017). In the English-language literature, the terms “climate change literacy” or “climate science literacy” are also used synonymously with “climate literacy”. Climate literacy (CL) is seen as an interface between climate science and environmental education approaches. The meaning, scope and content of this concept are defined differently internationally (ibid.). The following is an overview of common concepts and dimensions of CL and their relevance with regard to climate-positive action.

Azevedo, José & Marques, Margarida (2017). *Climate literacy: a systematic review and model integration*. International Journal of Global Warming, 12(3/4), 414-430.

- Climate is regulated by complex interactions among components of the Earth system.
- Life on Earth depends on, is shaped by, and affects climate.
- Climate varies over space and time through both natural and man-made processes.
- Our understanding of the climate system is improved through observations, theoretical studies, and modelling.
- Human activities are impacting the climate system.
- Climate change will have consequences for the Earth system and human lives.

In addition to a basic understanding, the ability of an individual to effectively integrate and use this knowledge is also a goal of CL (ibid.). Accordingly, climate literacy is defined as a **critical area of competence and knowledge** that decisively influences the decisions of individuals and societies for or against climate-conscious action.

Subsequent conceptualisations (Milěj & Sládek, 2011; Azevedo & Marques, 2017; Kolenatý et al., 2022) have significantly expanded the dimensions of CL. In addition to **knowledge**, climate-relevant **skills** and **personal values or attitudes** also play a role in the development of climate literacy.

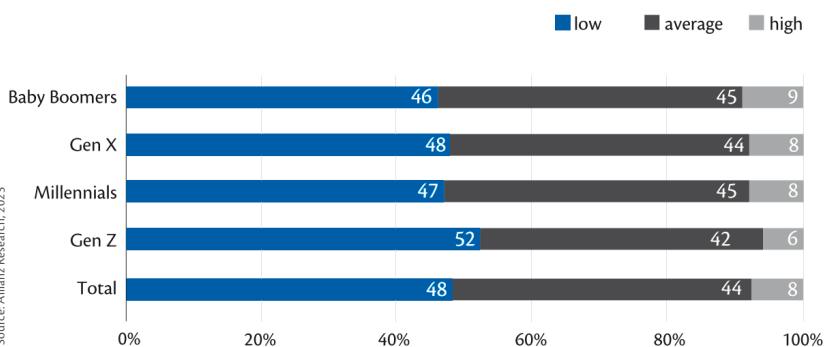
A climate literate person therefore not only knows and understands the key principles of the Earth’s climate system. They also know how to competently obtain **information** about the climate and climate change and how to **evaluate** scientifically grounded information on climate. There is a clear overlap in terms of content between climate literacy and the concept of media literacy (Cooper, 2011).

In addition, climate literate people are **aware** of man-made climate change, develop corresponding **attitudes and values** for themselves, and adapt their **actions** in everyday life accordingly (Azevedo & Marques, 2017). This makes climate literacy an important

CONCEPTS AND DIMENSIONS

Early conceptualisations of CL focused primarily on **knowledge** of the fundamentals of climate science, interrelationships and impacts of human-induced climate change. For example, the 7 Essential Principles of Climate Literacy of the U.S. Global Change Research Program (USGCRP, 2009) refer to the following aspects of basic climate knowledge:

- The sun is the primary source of energy for the Earth’s climate system.



Ill. 1: Knowledge of climate change is alarmingly low across countries and age groups (sample: 7,843 people aged 18 and over from Brazil, India, China, France, Germany, Italy, the UK and the U.S.)

prerequisite for climate-conscious and climate-just action (Kolenaty et al., 2022).

At the societal level, climate literacy is a prerequisite for citizens to be able to participate in **public discourse as knowledgeable individuals**. Climate-literate citizens are better prepared to face and adequately respond to the environmental and economic challenges (and opportunities) of climate change. However, the challenge to significantly increase the climate literacy of societies is enormous, as in some countries and cultures the rejection of the fact of man-made climate change is sometimes very pronounced (Capstick et al., 2015).

At the individual level, climate literacy can positively change awareness of personal **self-efficacy** by highlighting the links between individual behaviour and global impacts (Ernst et al., 2017). Individuals' concerns and risk perceptions regarding climate change are not only influenced by their knowledge, but are also closely linked to their personal values, political orientations and cultural worldviews (Aksit et al., 2018).

U.S. Global Change Research Program (USGCRP) (2009). Climate Literacy. The essential principles of climate science. Washington, DC: Global Change Research Program. Available at: https://downloads.globalchange.gov/Literacy/climate_literacy_high-res_english.pdf [13.3.24]

Milěř, Tomáš & Sládek, Petr (2011). *The climate literacy challenge*. International Conference on Education and Educational Psychology, 12, 150-156.

Kolenaty, Miloslav, Kroufek, Roman & Činčera, Jan (2022). *What triggers climate action. The impact of a climate change education program on students' climate literacy and their willingness to act*. Sustainability, 14, 10365.

Cooper, Caren (2011). *Media literacy as a key strategy toward improving public acceptance of climate change science*. BioScience, 61(3), 231-237.

Capstick, Stuart et al. (2015). *International trends in public perceptions of climate change over the past quarter century*. WIREs Climate Change, 6(1), 35-61.

Ernst, Julie, Blood, Nathaniel & Beery, Thomas (2017). *Environmental action and student environmental leaders: Exploring the influence of environmental attitudes, locus of control, and sense of personal responsibility*. Environmental Education Research, 23(2), 149-175.

Aksit, Osman et al. (2018). *The influence of instruction, prior knowledge, and values on climate change risk perception among undergraduates*. Journal of Research in Science Teaching, 55(4), 550-572.

CLIMATE KNOWLEDGE AND CLIMATE-COMPETENT ACTION

Although knowledge about climate change, its causes and impact is an important basis for all other components of climate literacy (Metag et al., 2017), the provision of climate knowledge alone does not automatically lead to an increased willingness to act or adapt constructively to the impacts of climate change. Studies have shown that knowledge-based climate literacy strategies may be ineffective, especially among adults, because their assessment of global warming is predominantly based on an **individualistic and politicised worldview** rather than a science-based one (Stevenson et al., 2014). Among adults, a hierarchical perception of society also appears to correlate with a sceptical and negative view of climate change and its risks (Smith & Leiserowitz, 2012).

Scientists assume that adolescents are more open to science-based interventions in the context of climate education due to their evolving worldview (Stevenson et al., 2019). **Individual acceptance** of man-made climate change is key to children's and young people's climate-positive behaviour. Climate knowledge can therefore be a **key predictor of future decision-makers' risk perceptions** of climate change (Aksit et al., 2018).

Knowledge of and interest in climate change is low

However, international studies show that knowledge about climate change and its global impacts is weak across all age groups (Ill. 1; Borgþórsdóttir, 2023; Corner et al., 2015). Generation Z in particular is characterised by low climate literacy, even though its members are often the driving force of climate protest (Allianz Research,

2023). There is currently even talk of "climate fatigue" in various parts of the world (ibid.). Therefore, there is an urgent need to develop age-appropriate information, narratives and strategies in education and the media to promote climate literacy and thus create a foundation for climate-positive action. ■

Metag, Julia, Füchslin, Tobias & Schäfer, Mike (2017). *Global warming's five Germanys: A typology of Germans' views on climate change and patterns of media use and information*. Public Understanding of Science, 26(4), 434-451.

Stevenson, Kathryn et al. (2014). *Overcoming skepticism with education: Interacting influences of worldview and climate change knowledge on perceived climate change risk among adolescents*. Climatic Change, 126, 293-304.

Smith, Nicholas & Leiserowitz, Anthony (2012). *The rise of global warming skepticism: Exploring affective image associations in the United States over time*. Risk Analysis, 32(6), 1021-1032.

Stevenson, Kathryn, Peterson, Nils & Bondell, Howard (2019). *The influence of personal beliefs, friends, and family in building climate change concern among adolescents*. Environmental Education Research, 25(6), 832-845.

Borgþórsdóttir, Emílija (2023). *Climate Literacy: A critical factor in promoting pro-climate behavior*. Thesis. University of Iceland, School of Engineering and Natural Sciences.

Corner, Adam et al. (2015). *How do young people engage with climate change? The role of knowledge, values, message framing, and trusted communicators*. WIREs Climate Change 6(5), 523-534.

Allianz Research (2023). *Climate fatigue*. Allianz Climate Literacy Survey 2023. Munich: Allianz. Available at: https://www.allianz.com/content/dam/onemarketing/azcom/Allianz_com/economic-research/publications/specials/en/2023/november/2023-11-29-climate-literacy-AZ.pdf [13.3.24]

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