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Transformative Agency in Climate Education (TRACE): A Project Linking Climate Literacy, Individual and Collective Action

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Climate change education has made substantial progress in understanding how to foster students' scientific understanding and individual pro-environmental engagement (Aeschbach et al., 2025; Wildbichler et al., 2025). At the same time, recent research points to a persistent tendency to frame climate action only as an individual responsibility, while collective, strategic, and political dimensions of agency remain underrepresented in formal education (Kranz et al., 2022). This narrow perspective risks depoliticising climate education and limiting students' understanding of how individual and collective forms of action interact within democratic societies. The Erasmus+-Project TRACE (Transformative Agency in Climate Education) addresses this challenge by developing and empirically investigating an educational design that explicitly integrates individual and collective as well as strategic and political dimensions of climate action. Rather than positioning these forms of agency as competing or hierarchical, TRACE conceptualises them as complementary and mutually reinforcing components of climate action (Otto et al., 2020).

In the project, we develop a digital self-reflection tool that supports students' metacognitive reflection on different climate mitigation and adaptation strategies, including individual, collective, strategic, and political actions. The tool is not intended to prescribe "better" forms of action, but to make students' assumptions, uncertainties, stances, attitudes and knowledge gaps explicit and open to discussion. Building on these reflections, TRACE implements a modular student lab in which learners engage with climate science, emissions pathways, and decision-making processes through specifically designed activities. Particular emphasis is placed on connecting personal engagement with collective processes, such as policy-making, institutional change, and democratic participation. The project further investigates how such learning environments can be transferred into everyday school teaching through teacher professional development and open educational resources. By addressing the de-politicisation of climate education while avoiding simplistic dichotomies between individual and collective responsibility, TRACE aims to contribute to empirically grounded design principles for climate education that support informed, reflective, and democratically embedded climate agency.

The contribution presents the overall design and research logic of TRACE, including its theoretical

grounding, methodology, and cross-national implementation. Particular emphasis is placed on the self-reflection tool, which is discussed in detail with regard to its conceptual framework, design features, and role within the broader learning environment.