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T^{CHANGE}: the role of values and visioning in transformation science

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There is growing recognition of the role of values and visioning for transdisciplinary co-production of knowledge and social transformation. Mapping and deliberating values and envisioning desirable futures are seen as important aspects of transformational learning. T^{CHANGE} (Addressing the Climate Crisis through Value Transformation) aimed to examine how values and anticipating future pathways could be assessed in collaboration with transformational communities. Initially, researchers and practitioners from five countries had divergent views about methodological standards, reflecting distinct ontologies and asymmetrical power relations within the team. However, the emerging tension between scientific rigor, societal relevance, and experiential learning proved productive for flexibility in the problem framing and team building phase of the transdisciplinary co-design process.

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Introduction

It is no trivial undertaking to be a responsible and ethical citizen in the Anthropocene, an epoch characterized by high social–ecological and technical complexity, daunting social and environmental uncertainty, and pressing global challenges, particularly climate change and persistent poverty [1•,2]. Our current institutions and governance structures, hampered by the path dependency of human behavior and growing materialism, are ill equipped to respond to these challenges [3]. The field of sustainability science acknowledges the complex interactions between nature and society [4] and examines transition pathways toward sustainability, foregrounding problem-driven and solution-oriented approaches and transdisciplinary and participatory research [5–8]. Concerns for sustainability transitions and social transformation have also entered the climate change debate, outlining potential pathways for responsible action, often portrayed as deliberate, local, and desirable [9–12]. Deliberate transformation is seen as a normative process that interrogates 'the values, the challenging of assumptions, and the capacity to closely examine fixed beliefs, identities and stereotypes' [9].

Deliberate transformation: values, visioning, and learning

Transdisciplinary co-production of knowledge is at the heart of transformational sustainability research, acknowledging the vital role of generating actionable knowledge that is place-based, integrative, reflexive, and reflective of different value systems, political agendas, and non-human needs and actors [4,8,13,14,15••,16]. Participatory and social learning processes in which scientists work alongside citizens, activists, and other stakeholders form a key pillar of such co-production, often based on the principles of post-normal, mode-2, and community-driven science and learning [17]. Through collective dialogue, such co-production practices aim to reconcile divergent values and allow ownership for problems and potential solutions, as well as generating socially robust knowledge, partnerships across disciplinary and societal divides, and practice-based experience rooted in real life contexts [3,18–20,21••]. A set of coproductive capacities, as argued by van Kerkhoff and Lebel [16], form the foundation of coproduction.

A growing body of literature on the co-production of knowledge and transformative learning focuses on the role of values and visioning. Mapping and deliberating values as well as envisioning and pursuing desirable futures not only allows for outlining transformation pathways but also addresses the normative dimensions of such

futures and values of future generations who will inhabit them [8,21••,22,23••,24]. Such future-oriented learning is a process that creates changes in how people see themselves and their worlds; it can even involve deeply personal transformation of values, dispositions, and sense of identity [25]. Future thinking and future visions are linked to anticipatory transformational learning. Creating viable and desirable visions hinges on our abilities to expand from question-based learning to challenging, reflexive, playful experimentation that opens spaces for engaging with processes of transformational value, to imagine/enchant, detach/subvert, experience, and empower/catalyze [26] and for active bodily learning [27]. Such engagements constitute a vital basis for iterative reflective processes to co-design, co-produce, and co-disseminate knowledge [15••].

Values in social transformation play a critical role, in the context of environmental decision-making [28], contributing to attitudes and behaviors [29] as well as fueling activism [30]. In the domain of climate change, studies have demonstrated the relationship of values to individual's understandings of climate change and to their beliefs about and responses to climate risk [31–34]. However, there remain crucial aspects of the role of values in the context of social transformation and climate change that have not received adequate attention. These include the issue of how values are negotiated across differently positioned stakeholders and how value tradeoffs and value disagreements between dominant and marginalized groups are best adjudicated [35]. Those in position of power often have the ability to dominate the discourses so that their values and norms have a disporportionate impact on decision-making [36]. Hence, the need to study not simply how values shape preferences concerning mitigation or adaptation choices, but an urgent need to study how best to encourage critical dialogue and debate about value differences and tradeoffs [37]. This is made particularly complex given that there are 'frequent changes in individual value priorities'' [38, p. 54] and an individual's values are often context-specific [33,39]. Transformative learning can and should be enhanced by explicitly addressing trade-offs and dilemmas between different objectives and the values that drive them [39,40]. In the context of climate change, deliberating trade-offs is part and parcel of climate-resilient pathways where iterative learning, values and worldviews, innovation, and people's own visions toward sustainability are taken into account [41,42].

Co-designing a research agenda with transformational communities

The main aim of the pilot project described here, entitled 'T^{CHANGE} — Addressing the Climate Crisis through Value Transformation', was to employ a transdisciplinary co-production research approach to examine communities that have deliberately embarked on transformational pathways (TCommunities). Little is understood about the processes of transformational learning in such communities and the extent to which they involve reflexive, iterative practices, conscious explorations of values, and performative visioning. We structure the following reflection on the co-design process by drawing upon the first phase of transdisciplinary research as proposed by Lang *et al.* [7]: problem framing and team building. We overlay this structure with several of Polk's [42] coproduction principles: inclusion, collaboration, integration, usability and flexibility. We end with lessons learned from this process and situate these in the literature on barriers to transformational learning.

T^{CHANGE} was designed to explore understandings of transformational learning, the underlying roles of values and world views, the place of envisioning different futures, obstacles encountered throughout the process, and resources for overcoming such hurdles. Team members came from Norway, South Africa, India, the United States, and Scotland and represented academics and practitioners in NGOs and think tanks, as well as communities already embarking on transformational trajectories. The goal was to address Polk's [21••] inclusion principle by selecting team members from across geographic and cultural divisions, reflecting scholarly interest in the topic, expertise in participatory learning processes, membership in an existing TCommunity (e.g. transition town, eco-village, transformational practice group), and curiosity to learn and connect. Our research process revealed that TCommunities, largely due to their place-based nature, are often not connected to similar activities elsewhere and face difficulties in sustaining their activities or branching out and scaling up. Moreover, the lack of meaningful metrics to measure and monitor progress toward real social change — for instance voluntary contributions made to local and regional governments to the benefit of citizens' well-being and urban/rural development — seem to undermine recognition and stifle motivation.

In order to collaboratively define our research objectives, questions, and partnerships, the team came together for a three-day face-to-face workshop in the United States in February 2015, with seven female and eight male team members present (four graduate students, one post-doc, five practitioners, and five academics), including also some virtual participations due to travel constraints. The workshop was structured around presentations and experiences from TCommunities and researchers working on experiential learning, values, and future visioning under the large umbrella of climate change. Polk's [21••] collaboration principle was met by creating spaces in which practitioners and researchers could listen to and discuss the meanings of values, learning, and transformation, through personal stories, initial data collection and experiences across four continents, academic theories and