Creating spaces and cultivating mindset for transdisciplinary learning and experimentation Pathways beyond the International Transdisicplinarity Conference 2021

Pearce, B.J.; Vienni-Baptista, Bianca; Stauffacher, Michael ; Paulsen, Theres; Krütli, Pius; Buser, Tobias; Salsabila, Nabila Putri ; Christl, Celine

DOI
10.14512/gaia.32.1.6

Publication date
2023

Document Version
Final published version

Published in
GAIA - Ecological Perspectives for Science and Society

Creating spaces and cultivating mindsets for transdisciplinary learning and experimentation

Pathways beyond the *International Transdisciplinarity Conference 2021*

This Special Focus highlights the potential of transdisciplinary research and learning to confront the complexity of the challenges facing society today. By serving as a bridge between science, practice and society, transdisciplinarity can be a means to help foster collaboration between diverse actors, question existing paradigms of knowledge co-production and build pathways towards transformation.

BinBin J. Pearce, Bianca Vienni-Baptista, Michael Stauffacher, Theres Paulsen, Pius Krütli, Tobias Buser, Nabila Putri Salsabila, Celine Christl

Creating spaces and cultivating mindsets for transdisciplinary learning and experimentation.
Pathways beyond the *International Transdisciplinarity Conference 2021* | *GAIA* 32/1 (2023): 102–106
Keywords: learning, online conference, science-society interface, td-net, transdisciplinarity

Global crises unleashed by climate change, the COVID-19 pandemic and Russia's war in Ukraine compel us to find sustainable solutions to social, cultural, political, economic, environmental, and health challenges. Yet, these crises have shown us, once again, that existing modes of overcoming challenges are limited or are yet to be implemented. There is thus a critical need to move beyond what we already know and do. Science must play a pivotal role in supporting societies to search for, create and explore diverse pathways to meeting these challenges. The communities of transdisciplinary (TD) researchers and practitioners are willing and poised to connect scientific endeavors with societal concerns to create and cultivate spaces for overcoming these complex challenges.

The *International Transdisciplinarity Conference 2021 (ITD21),* ***Creating Spaces and Cultivating Mindsets for Learning and Experimentation,***[1] provided an online platform to bring these communities together. There were 528 registered participants, 146 poster/video/audio contributions and 47 workshops.[2] The conference focused on fostering engagement, discussion, and actions that link TD research, learning, and practice from across 20 countries distributed across the continents. The *Network for Transdisciplinary Research (td-net),* a competence centre of the Swiss Academies of Arts and Sciences, was the organiser, along with the Transdisciplinarity Lab (TdLab), based in the Department of Environmental Systems Science at ETH Zurich, CH. Since 2000, these conferences have aimed to build TD communities, bringing together scholars and practitioners from different backgrounds to push forward the development of transdisciplinarity, and to spark further cooperation and innovation (Vienni-Baptista et al. 2021). What binds the orientation of this community is a focus on a reflexive research approach that addresses societal problems through the collaboration between disciplines and with extra-academic actors to frame, analyse and implement the outcomes of the research (Jahn et al. 2012, Lang et al. 2012). Additionally, TD research results in mutual and transformational learning for both researchers and practitioners, production of diverse types of knowledge (descriptive, normative, transformative), as well as progress in the understanding of and/or tangible improvements

Asst. Prof. Dr. BinBin J. Pearce | Delft University of Technology | Faculty of Technology, Policy and Management | Delft | NL | b.j.pearce-1@tudelft.nl

Dr. Bianca Vienni-Baptista | Swiss Federal Institute of Technology (ETH) Zurich | Department of Environmental Systems Science | Transdisciplinarity Lab | Zurich | CH | bianca.vienni@usys.ethz.ch

Prof. Dr. Michael Stauffacher | Swiss Federal Institute of Technology (ETH) | Zurich | Department of Environmental Systems Science | Transdisciplinarity Lab | Zurich | CH | michael.stauffacher@usys.ethz.ch

Theres Paulsen | Swiss Academies of Arts and Sciences | Bern | CH | theres.paulsen@scnat.ch

Dr. Pius Krütli | Swiss Federal Institute of Technology (ETH) Zurich | Department of Environmental Systems Science | Transdisciplinarity Lab | Zurich | CH | pius.kruetli@usys.ethz.ch

Tobias Buser | *Global Alliance for Inter- and Transdisciplinarity (ITD Alliance)* | Bern | CH | tobias.buser@itd-alliance.org

Nabila Putri Salsabila | Swiss Federal Institute of Technology (ETH) Zurich | Department of Environmental Systems Science | Transdisciplinarity Lab | Zurich | CH | nsalsabila@student.ethz.ch

Celine Christl | Swiss Federal Institute of Technology (ETH) Zurich | Department of Environmental Systems Science | Transdisciplinarity Lab | Zurich | CH | cchristl@student.ethz.ch

https://doi.org/10.14512/gaia.32.1.6
Received March 14, 2023; revised version accepted April 24, 2023 (editorial board review).

1 *https://go.transdisciplinarity.ch/itd21*
2 The *ITD21* conference report provides further details: *https://go.transdisciplinarity.ch/itd21-report*.

of the societal problems can be demonstrated (Mitchel et al. 2015, Pohl et al. 2017). However, there is a multiplicity of understandings of transdisciplinarity (as well as interdisciplinarity) that includes a diverse collection of disciplinary perspectives and actors involved in such research (Vienni-Baptista et al. 2022). The conference sought to highlight and connect the plurality of these various definitions.

With this Special Focus, we collect and reflect on some of the most salient insights from the 2021 edition of *ITD* conferences, gathered from regions around the world. It highlights the emerging potential of TD research and learning by building on original research and discussion articles inspired by the themes of the conference. These themes represent the various areas of TD research and its practice identified to be topics of high interest across diverse groups and represent TD issues that require further development. These themes include:

1. Integrative TD research – advancing concepts and methodologies by bringing together multiple fields of expertise,
2. Transdisciplinarity-on-the-ground – making TD processes more tangible and explicit to practitioners and researchers,
3. Global and virtual transdisciplinarity – connecting and enabling diverse communities and practices,
4. TD learning for transformation – contributing to transformation through TD learning, and
5. Institutionalising and funding transdisciplinarity – anchoring TD in different organisational levels.

The theme of "integrative TD research" is focused on how to integrate expertise from diverse disciplines and professions, while acknowledging the differences in concepts, language and practices to contribute to envisioning and co-producing alternative futures. The theme of "transdisciplinarity-on-the-ground" centers on concepts and research aimed at making TD processes more tangible and explicit, to better understand their impact and improve their effectiveness. The "global and virtual transdisciplinarity" theme is about connecting TD communities situated in different geographical contexts to diversify the perspectives within TD and to broaden the perspectives of those working in the field. It also explores online and hybrid tools for TD to take advantage of more inclusive modes of communication with researchers and practitioners around the world. The "TD learning for transformation" theme focuses on highlighting and bringing together the various approaches to TD learning in higher education, which have shown to help society take on complex challenges. The theme of "institutionalizing and funding TD research" reflects on how funding schemes, curriculum design and management structures of higher education institutions may hinder or support the increasing role that TD approaches are playing in research and learning. This Special Focus examines these themes by asking three fundamental questions related to the development of transdisciplinarity:

1. What is the potential of TD research and learning for contributing to effective responses to sustainability challenges?
2. What are the challenges of TD research and teaching in reaching this potential?
3. What are the most important and fruitful paths moving TD research and teaching forward?

The answers to these questions emerge from diverse geographical, gender and career trajectory orientations. It is from this multiplicity of voices that we hope to identify the pathways forward which help us to harness the potential of carrying out TD research and teaching, hand-in-hand with those working in practice, allowing us to confront global challenges together. We aim to do this by being fully awakened to the challenges ahead and with a mindset of pushing the current boundaries of TD. The sections below summarise responses to these questions offered by authors of this Special Focus section.

The potential of transdisciplinary research and learning

Characterising science-society practices and processes across and within global contexts

Taking a TD lens regarding science-society practices and processes across and within global contexts opens the possibility of articulating the importance of context in identifying and attending to what matters. Bringing insights from the Global South, ***Aymara Llanque Zonta, Johanna Jacobi, Stellah Mukhovi, Eliud Birachi, Per von Groote, and Carmenza Robledo Abad*** explain the existing interactions between science, policy, and practice within TD projects, what TD processes enable these interactions, and how co-creation processes can contribute to sustainable transformation efforts in varying contexts. The authors document and characterize the variety of TD practice processes implemented on-the-ground.

The role of transdisciplinarity in building a decolonial bridge between science, policy, and practice
pp. 107–114

Promising practices for dealing with complexity in research for development
pp. 115–125

Carmenza Robledo Abad, Sabin Bieri, René Eschen, Sandra Fuerst, Johanna Jacobi, Elizabeth Jiménez, Aymara Llanque Zonta, Meleesa Naughton, Urs Schaffner, Mirko S. Winkler, and Manuel Flury explore how transboundary research partnerships can be understood and analysed as complex adaptive systems and how this complexity can be addressed through TD practices.

>

Reflecting on a case in Aotearoa-New Zealand, ***Melissa Robson-Williams, Nichola Harcourt, and Ocean Mercier*** explore the role that transdisciplinarity can have in including Indigenous knowledge within scientific processes. They introduce *mātauranga Māori,* Aotearoa-New Zealand's Indigenous knowledge system, in addressing complex environmental challenges, but also point out that more needs to be done to incorporate alternative world views in science. By showcasing how TD processes are carried out in the field and by highlighting projects from the Global South, the themes of "trandisciplinarity-on-the-ground" and "global and virtual transdisciplinarity" are addressed with these articles.

Achieving societal collaboration and impact in Aotearoa-New Zealand through transdisciplinarity
pp. 126–130

Transforming the role of science and researchers in relation to society

The potential of transdisciplinarity also resides in its ability to transform familiar arrangements and roles that are inhabited by science and researchers. ***Carla Alvial Palavicino, Olivier Ejderyan, and Bianca Vienni-Baptista*** discuss how the areas of transdisciplinarity and transformation research can enrich each other to address sustainability problems through three pathways: moving from transdisciplinarity "for" transformation to transdisciplinarity "as" transformation, identifying spaces for conceptual and methodological cross-fertilisation, and deepening cross-fertilisation between these discourses.

Building pathways between transdisciplinarity and transformation. Lessons from practice
pp. 131–137

Touching on the issue of justice, ***Jenny Lieu, Amanda Martínez-Reyes, Phillippa Groome, Diana Mangalagiu, BinBin J. Pearce, Baiba Witajewska-Baltvilka, and Regine-Ellen D. Møller*** explore how to facilitate fair knowledge co-production in research within large-scale projects such as the *Horizon Europe* programme and proposes an integrative and inclusive TD framework for conducting such projects. These authors suggest that transdisciplinarity holds the potential to challenge existing power imbalances in knowledge production. These are topics under the theme of "integrative TD research", where varying modes of TD research are brought together in new concepts and demonstrations of its applicability.

Inclusive stakeholder engagement for equitable knowledge co-production. Insights from the EU's* Horizon 2020 *programme in climate change research
pp. 138–143

Redesigning public and academic learning processes

The potential of transdisciplinarity is also exhibited in how learning processes are being redesigned and rethought for both diverse societal actors and students. In writing about the *Biomodd* project, ***Ulrike Kuchner, Mona Nasser, Pieter Steyaert, Zeynep Birsel, Diego S. Maranan, Agatha Haines, Ann Peeters, and Angelo C.J. Vermeulen*** introduce a hybrid co-creation process that looks at ways in which nature, humans, and technology can co-exist to tackle global challenges. Scientists create and facilitate a process in which participants are encouraged to ask questions and generate ideas while revisiting current approaches. The project allowed for online collaborative idea generation relying on individual experimentation and collective discussion.

Biomodd: ***The integration of art into transdisciplinary research practices***
pp. 144–153

Susan Thieme and Patricia E. Fry shed light on the role of TD learning methods for creating change. They deep-dive into the social learning video approach and how it can be used to teach TD concepts, methods, and skills through research-based learning. The authors connect questions around knowledge production and social participation, while enabling students to test competencies in action. These selections address the theme of "TD learning for transformation", where various TD learning approaches take centerstage.

Teaching transdisciplinary competencies for sustainability transformation by co-producing social learning videos
pp. 154–161

Challenges ahead

In meeting its potential, TD research and learning also face challenges along the way, which are also sources of inspiration for moving the field forward.

Advancing transdisciplinarity: Learning, teaching, and institutionalizing
pp. 162–166

Complementarity between the traditional and the "transdisciplinary university"

TD learning and teaching are often arranged as special programs rather than treated as an integral component of curricula and degree programmes, particularly in sustainability education. ***Julie Thompson Klein*** (see also Vienni-Baptista et al. 2023, in this issue) offers insights into how the gap between the "rhetoric of endorsement" and actual implemen-

tation of interdisciplinary and TD learning could be narrowed. Discussions and workshops taking place during the *ITD21* conference touched upon the theme of "institutionalising and funding transdisciplinarity". They alluded to the challenge of promoting TD approaches for learning and teaching. Related to Klein's *Forum* article, overcoming barriers in the institutionalisation processes support emerging interdisciplinary and TD learning and teaching practices, resolving tensions with traditional practices through shared values of solidarity, democracy, respect, and collaboration.

Transdisciplinarity as queer

Although TD research is one key to achieving sustainability transformation, researchers embedded in TD approaches are still deemed as "peculiar". Inspired by queer theory, ***Guido Caniglia and Coleen Vogel*** suggest a provocative analogy – TD sustainability researchers are to academia what queer people are to a heteronormative, gender-binary world, as both experience disorientation and the need to learn how to transgress established norms. TD sustainability researchers can learn from queer lives and theories to tap the potential of transgressive practices. The statement entails an invitation to embrace the oddity of not complying with established norms and learn from those who have resisted normalisation. This contribution adds to discussions within the themes of "global and virtual transdisciplinarity" and "transdisciplinarity-on-the-ground" in that it illuminates the lived experiences of those who practice and study transdisciplinarity in diverse contexts.

On being oriented. Strengthening transgressive orientations in transdisciplinary sustainability research through queer theory
pp. 167–171

Early career researchers' struggle

Early career researchers (ECRs) face similar obstacles that go beyond disciplinary difficulties when stepping into the TD research domain. ***Vanja Djinlev, Irina Dallo, Stefan Markus Müller, Mélanie Surchat, Juanita von Rothkirch, Ariane Wenger, and Leonhard Späth*** outline challenges and lessons learned by ECRs: 1. collaborating among multiple disciplines that entails hierarchical structures and different cultures, 2. choosing and integrating different research methods while understanding the methodological differences, and 3. knowing which, how, and when to involve stakeholders. Drawing from their personal experience, the authors recommend developing a culture of individual reflection, seeking out support with more experienced TD researchers and facilitating informal spaces for these exchanges to develop tailored coping mechanisms. These actions would address ECRs' need to become more flexible, better understand the role of context in their work, and clarify their own roles within TD research projects. The involvement and condition of ECRs from around the world in transdisciplinarity are also linked to themes in "transdisciplinarity-on-the-ground" in addressing how future TD work needs to be supported in the real world.

Challenges and strategies in transdisciplinary research – early career researchers' perspectives
pp. 172–177

Evaluating the impact of transdisciplinarity

Despite its complexity, transdisciplinarity contributes to the utilisation of knowledge in multiple development pathways, but how do we evaluate its research impact? ***Josefa Kny, Rachel Claus, Janet Harris, and Martina Schäfer*** found common challenges in TD research impact assessment across multiple fields. In documenting and demonstrating whether, when, and how research has contributed to change, researchers face similar obstacles: 1. confirming causal claims, that is, building counterfactual scenarios, 2. including diverse perspectives – which can be conflicting, and 3. sustaining continuous monitoring and evaluation. Several solutions are proposed: impact data triangulation and formative evaluation.

Assessing societal effects: Lessons from evaluation approaches in transdisciplinary research fields
pp. 178–185

In particular, the Theory of Change tool was explored by ***Rachel Claus, Rachel Davel, Cheryl Heykoop, Daniela Pinto, and Brian M. Belcher*** to help develop a shared conceptual understanding, facilitate context analyses and collective brainstorming, provide opportunities for capacity-building, as well as to inform decision-making. The authors also offer guidance to support effective Theory of Change design and TD collaboration based on the authors' experience in facilitating its development for use in research planning and evaluation. This contribution adds to the theme of "integrative TD research", in which advancements of the evaluation of TD research is in focus.

How to build Theories of Change for transdisciplinary research: Guidance and considerations
pp. 186–196

>

Moving forward

The (re-)occurrence of wars, pandemics and climate change-related disasters have shown us that humanity's socio-technical and environmental problems are not isolated problems, but rather exist in the complexity of systems and relationships with one another. Reckoning with this complexity reveals the need to develop competencies not only for describing and analysing the world in which we live, but also competences for future literacy, to understand the role of the future in what we do, for deep listening and for imagining new possibilities that do not yet exist. To play a role in this future, it will require researchers to break down the long-established silos of the way we (co-)produce and use knowledge and to rethink the role of scientific expertise. TD research, teaching and practice can help to do this. The authors in this collection demonstrate that transdisciplinarity is a mindset that embraces a diversity of practices, methodologies and outputs with which science can contribute to a societal transformation towards sustainability. Transdisciplinarity may also offer an approach for carrying out research and learning that includes perspectives on scientific questions and outcomes that come from beyond academy. It seeks to acknowledge the different realities, knowledge systems and means of knowledge production from a wide range of actors within society.

So far, TD approaches to research and learning have emphasised the importance of local context and its impact on the outcome of specific approaches for sustainable development. Even more work along these lines will need to be carried out to link understanding of the local context to developing viable strategies for future action. The establishment of more real-world (or living) labs can help to link TD approaches to on-the-ground concerns of local communities. These spaces can link activism and research and help to foster TD competences for emerging TD scholars and practitioners. In addition, the development of online learning formats will be key for establishing and nurturing a global community of practice which fosters a "trans-local" approach to sharing experiences of engaging with complex problems. These embedded spaces of learning together point to a way of carrying out research that requires researchers to bring their whole selves into the work that they do, and to include a reflective and ethical dimension in the scientific work that is being carried out. It encourages a way of working that is ultimately needed for us to bring about transformation in the world.

We hope this collection of articles can spur the discussion of transdisciplinarity as a transformative element towards sustainability, while at the same time inspire many readers – regardless of their role and background – to engage in, contribute to, and improve upon the ideas as a basis for further TD research, learning and practice.

Funding: The conference leading to this Special Focus was financially supported by the Swiss Confederation, State Secretariat for Education, Research and Innovation (SERI), the Swiss National Science Foundation (SNSF), Swiss Federal Institute of Aquatic Science and Technology (eawag), Swiss Academy of Humanities and Social Sciences (SAGW) and the Swiss Academy of Sciences (SCNAT).

References

Alvial Palavicino, C., O. Ejderyan, B. Vienni-Baptista. 2023. Building pathways between transdisciplinarity and transformation: Lessons from practice. *GAIA* 32/1: 131–137. https://doi.org/10.14512/gaia.32.1.10.

Caniglia, G. C. Vogel. 2023. On being oriented: Strengthening transgressive orientations in transdisciplinary sustainability research through queer theory. *GAIA* 32/1: 167–171. https://doi.org/10.14512/gaia.32.1.15.

Claus, R., R. Davel, C. Heykoop, D. Pinto, B. M. Belcher. 2023. How to build Theories of Change for transdisciplinary research: Guidance and considerations. *GAIA* 32/1: 186–196. https://doi.org/10.14512/gaia.32.1.18.

Djinlev, V. et al. 2023. Challenges and strategies in transdisciplinary research – early career researchers' perspectives. *GAIA* 32/1: 172–177. https://doi.org/10.14512/gaia.32.1.16.

Jahn, T., M. Bergmann, F. Keil. 2012. Transdisciplinarity: Between mainstreaming and marginalization. *Ecological Economics* 79: 1–10. https://doi.org/10.1016/j.ecolecon.2012.04.017.

Klein, J. T. 2023. Advancing transdisciplinarity: Learning, teaching, and institutionalizing. *GAIA* 32/1: 162–166. https://doi.org/10.14512/gaia.32.1.14.

Kny, J., R. Claus, J. Harris, M. Schäfer. 2023. Assessing societal effects: Lessons from evaluation approaches in transdisciplinary research fields. *GAIA* 32/1: 178–185. https://doi.org/10.14512/gaia.32.1.17.

Kuchner, U. et al. 2023. *Biomodd:* The integration of art into transdisciplinary research practices. *GAIA* 32/1: 144–153. https://doi.org/10.14512/gaia.32.1.12.

Lang, D. J. et al. 2012. Transdisciplinary research in sustainability science: Practice, principles, and challenges. *Sustainability Science* 7/S1: 25–43. https://doi.org/10.1007/s11625-011-0149-x.

Lieu, J. et al. 2023. Inclusive stakeholder engagement for equitable knowledge co-production: Insights from the EU's *Horizon 2020* programme in climate change research. *GAIA* 32/1: 138–143. https://doi.org/10.14512/gaia.32.1.11.

Llanque Zonta, A., J. Jacobi, S. Mukhovi, E. Birachi, P. von Groote, C. Robledo Abad. 2023. The role of transdisciplinarity in building a decolonial bridge between science, policy, and practice. *GAIA* 32/1: 107–114. https://doi.org/10.14512/gaia.32.1.5.

Mitchell, C., D. Cordell, D. Fam. 2015. Beginning at the end: The outcome spaces framework to guide purposive transdisciplinary research. *Futures* 65: 86–96. https://doi.org/10.1016/j.futures.2014.10.007.

Pohl, C., B. Truffer, G. Hirsch Hadorn. 2017. Addressing wicked problems through transdisciplinary research. In: *The Oxford handbook of interdisciplinarity.* Edited by R. Frodeman, J. T. Klein, R. C. S. Pacheco. 2nd edition. Oxford, UK: Oxford University Press. 319–331. https://doi.org/10.1093/oxfordhb/9780198733522.013.26

Robledo Abad, C. et al. 2023. Promising practices for dealing with complexity in research for development. *GAIA* 32/1: 115–124. https://doi.org/10.14512/gaia.32.1.8.

Robson-Williams, M., N. Harcourt, O. Mercier. 2023. Achieving societal collaboration and impact in Aotearoa-New Zealand through transdisciplinarity. *GAIA* 32/1: 126–130. https://doi.org/10.14512/gaia.32.1.9.

Thieme, S., P. E. Fry. 2023. Teaching transdisciplinary competencies for sustainability transformation by co-producing social learning videos. *GAIA* 32/1: 154–161. https://doi.org/10.14512/gaia.32.1.13.

Vienni-Baptista, B., I. Fletcher, C. Lyall, C. Pohl. 2022. Embracing heterogeneity: Why plural understandings strengthen interdisciplinarity and transdisciplinarity. *Science and Public Policy* 49/6: 865–877. https://doi.org/10.1093/scipol/scac034.

Vienni-Baptista, B., B. J. Pearce, M. Stauffacher, P. Krütli, T. Paulsen, T. Buser. 2021. Creating spaces and cultivating mindsets for learning and experimentation: *International Transdisciplinarity Conference 2021. GAIA* 30/3: 209–211. https://doi.org/10.14512/gaia.30.3.17.

Vienni-Baptista, B. et al. 2023. In memoriam: Julie Thompson Klein. *GAIA* 32/1: 84–85.